

# BULLETIN *of the* BUSINESS HISTORICAL SOCIETY

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### BULLETIN OF THE BUSINESS HISTORICAL SOCIETY, INC.

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## EXPANSION, REVERSION, AND REVOLUTION IN THE SOUTHERN SUGAR INDUSTRY: 1850-1910

Historians have properly considered the period of sectional strife to be a germinal source of major determinative forces in American history. Yet, preoccupation with the Civil War and Reconstruction, their causes and consequences, has so dominated the interests of historians of the South that they may well have neglected or misunderstood many of the basic economic developments of the region.

Let us be more skeptical of the plausible and widely held assumptions that the war was responsible for the economic institutions of the New South or that radical Reconstruction can be held accountable for many of the major economic problems of the post-Reconstruction era. The primary purpose of this article is to treat in summary fashion the broad developments in one southern industry, developments which in themselves suggest that the time has arrived to study southern economic development for its own sake.

Though sugar was produced from time to time in South Carolina, Georgia, Florida, Alabama, and Mississippi, the sugar industry of the ante bellum South was concentrated largely in Louisiana and Texas. From its beginnings in the eighteenth century, through the stimulus of a protective tariff, cheap and fertile land, a well organized labor force, good management, and technological advances, the industry grew impressively in the first half of the nineteenth century. By the 1850's the southern sugar industry with an annual crop of more than 150,000 tons produced almost one half of the sugar consumed in the United States.<sup>1</sup>

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**EDITOR'S NOTE:** This article was read as a paper at a session of the Mississippi Valley Historical Association, Lexington, Kentucky, May 8, 1953. The ideas contained herein along with the sources upon which they are based are developed more fully in J. Carlyle Sitterson, *Sugar Country: The Cane Sugar Industry in the South, 1753-1950* (University of Kentucky Press, Lexington, Ky., 1953). This article is printed here with the permission of the University of Kentucky Press.

<sup>1</sup> *De Bow's Review* (New Orleans, 1846-1880), X (1850), 565; *ibid.*, XXIX (1861), 523.

The ante bellum sugar industry was composed preponderantly of large plantations on which cane was grown and the syrup manufactured into sugar. In 1859 the more than 1,400 sugar plantations of the Louisiana-Texas area averaged almost 500 acres under cultivation and produced in that less than normal year, about 110 tons of sugar each. With its large acreage, expensive sugar-making equipment, and slave force of more than 70 Negroes, the average sugar plantation was valued at about \$125,000.<sup>2</sup>

The ante bellum sugar industry as a result of the heavy labor demands for cultivating and harvesting the cane required a large number of workers; from the beginning this need was supplied by Negro slaves. From 1840 to 1860, slaves formed approximately 60 per cent of the population of the sugar region.<sup>3</sup> The great expansion of the industry in the prewar period resulted in a heavy demand for the limited supply of slave labor with a consequent rise in the price of prime field hands on the New Orleans market from about \$600 in the 1820's to as much as \$1,200 in the 1850's.<sup>4</sup>

Throughout the ante bellum period, to supplement the slave force, sugar plantations utilized the services of hired white laborers—sugar makers and engineers during the grinding season, and throughout the year—carpenters, coopers, masons, and German and Irish transient workers for the arduous and hazardous work of ditching new land.

The management of an agricultural unit of such size and complexity was a demanding job. Realizing this, planters, with few exceptions, gave their holdings much of their time and attention. The many diaries of ante bellum planters generally reveal constant application to plantation affairs and well co-ordinated plans for the cultivation of the plantations and the production of their crops.<sup>5</sup>

However, by no means were all planters good managers. As in all occupations, there were misfits in the sugar economy. One irate

<sup>2</sup> Based on data in the manuscript census returns, schedule IV, "Productions of Agriculture," 1860 (Louisiana returns are at Duke University, Durham, N. C., and Texas returns are at the State Library, Austin, Texas).

<sup>3</sup> Computed from the census returns.

<sup>4</sup> U. B. Phillips, *American Negro Slavery* (New York, 1918), pp. 370-71.

<sup>5</sup> It is manifestly impossible to cite here the vast body of plantation records and correspondence upon which the above is based. In the main, these collections are located at the following depositories: the state universities of Louisiana, North Carolina, and Texas; Tulane University, New Orleans; and the City Archives, the Louisiana State Museum, and the Presbytere, New Orleans.

factor who had advanced heavily to a particular plantation exclaimed: "Doctor Chauvin . . . wants to obtain authority to purchase some two or three hundred cords of wood for the next Rolling . . . Damnation . . . How does he intend to employ the hands. A short crop planted, and yet he wishes to buy the wood necessary for the grinding season. Well, my friend, I wish I may be damned, if I am not more and more convinced that the Doctor is not competent to manage a sugar plantation."<sup>6</sup>

Sugar plantations were primarily producers of one cash crop for market: sugar and its by-product, molasses. Although planters considered diversification and agricultural journals never ceased urging it, most sugar plantations represented heavy capital investments necessitating a considerable annual cash return. As a result, they were much more highly specialized agricultural units than nonsugar farms. In the production of corn, peas, beans, Irish potatoes, sweet potatoes, and butter, and in the raising of livestock, noncane farms in proportion to total acreage and farm population far outstripped the sugar producers.<sup>7</sup> Unavoidable though it may have been, there was some truth in the remark of one planter, "The great curse of this country is that we are all planters and no farmers to wind up the crops."<sup>8</sup>

Sugar planters were not ignorant of the arguments for diversification. Far from it; either rightly or wrongly they chose agricultural specialization as the best means of producing profitable operations.

Ante bellum sugar planters generally employed the most approved agricultural methods in their plantation operations. Such problems as drainage, crop rotation, fertilization, and methods of cultivation all received attention. If, as one planter expressed it, the way to good planting was "to require one's hands to work from sun to sun, to cultivate no more than can be cultivated well, to keep everything on the plantation in good condition, let nothing go to waste, and keep ahead of the work," then ante bellum sugar planters qualified.<sup>9</sup>

In manufacturing, too, the widespread adoption of the steam-

<sup>6</sup> Martin Gordon, Jr., to Benjamin Tureaud, Feb. 23, 1850, Tureaud Collection (Louisiana State University).

<sup>7</sup> Manuscript census returns, schedule IV, "Productions of Agriculture," 1860.

<sup>8</sup> Kenneth Clark to Lewis Thompson, 1855, Lewis Thompson Papers (University of North Carolina).

<sup>9</sup> *Planter's Banner* (Franklin, La.), Jan. 2, 1851.

powered sugar mill (about 90 per cent of the mills were steam driven by 1861), the development of the bagasse burner, the use of two successive sets of rollers in grinding, improved methods of clarifying cane juice, and multiple-effect systems of making sugar in vacuum pans (though not then extensively adopted) are indicative of the progressive developments in that branch of the industry.<sup>10</sup>

The greater part of the sugar crop was shipped by way of the Mississippi River or by railroad to New Orleans for sale at auction on the levee. Considerable amounts, too, were shipped directly by planters for sale up the river in Memphis, St. Louis, and other valley cities and in southern and eastern markets such as Mobile, Savannah, Charleston, Baltimore, Philadelphia, and New York. Most of the Texas crop was sold in Houston and Galveston. Upon reaching the market, the sugar, packed in wooden hogsheads of 1,000 to 1,100 pounds, was consigned to the planter's factor. The factor or commission merchant charged 2½ per cent for selling sugar and a 2½ per cent commission on supplies purchased for the planter.<sup>11</sup>

The profitability of the ante bellum sugar economy was dependent upon the margin between the costs of production and the price of sugar. From the best available data, costs of producing direct consumption sugar in the period from 1800 to 1840 ranged from 4 to 6 cents per pound. Despite marked advances in cultivation and manufacturing from 1840 to 1860, the high cost of capital improvements and the heavily inflated value of slaves and plantations kept costs of production high. Rarely did costs fall below 4 cents a pound in the 1850's; for those planters who had acquired overvalued plantations on credit, costs of production frequently reached 6 to 7 cents per pound.

Prior to the Civil War the average price received for the southern sugar crop fell below 5 cents a pound for only ten years, all of these between 1841 and 1854. During the remainder of the period prices averaged from 5 cents to 14 cents per pound, high enough to allow profitable operations where plantations were efficiently managed and

<sup>10</sup> See "The Manufacture of Sugar" in *Sugar Country*, pp. 133-156.

<sup>11</sup> The Weeks Collection (Louisiana State University), the Bringier Collection (Louisiana State University), and the McCollam Papers (University of North Carolina) present an excellent picture of marketing practices. See also J. Carlyle Sitterson, "Financing and Marketing the Sugar Crop of the Old South," in *Journal of Southern History* (Baton Rouge, 1935), X (1944), 188-99.

crops economically produced. Over the long period (as is fully shown in *Sugar Country*, pp. 157-84), average returns ranged from about 9 per cent to 14 per cent of capitalization.

Prior to 1850, occasional bad years excepted, sugar planting was profitable for the majority of planters. In the closing decade of the period, however, a steady and substantial inflation of values of both land and slaves occurred in the sugar region, a rise in capital value that far exceeded increases in productivity. Planters who acquired overvalued plantations on credit would have ultimately faced financial disaster even if war had not brought it upon them.

As the slavery regime approached its end, the sugar economy was still a healthy economic enterprise, but there were clear indications that the growth stage of the industry as then organized was coming to an end. Moreover, without impressive technological advances, heavily inflated values were bound to result in a rocky road ahead. An experienced sugar planter appraised the fortunes of his fellow planter:<sup>12</sup>

For thirty years it was flood tide with him, and if stranded or wrecked it was his own fault and could not be charged to a lack of solidity in his occupation, sugar paid and paid well. Enormous outlays, lavish expenditures and a loose administration of their affairs ruined some and involved others heavily in debt but their failure could be traced to their own imprudence.

War dealt the sugar economy of the South a severe blow. The most visible signs of the devastation were the demoralization of the labor system and the destruction and loss of property. Sugar production experienced a sharp decline from a record crop of 230,000 tons in 1861 to 5,000 tons in 1864. Of the more than 1,400 sugar producers in 1861, there were less than 200 still in operation in 1864. From a capital investment of \$200,000,000 in 1861, the industry was worth no more than \$30,000,000 in 1865.<sup>13</sup>

With the end of the war, sugar planters were faced with the most dismal prospects in the history of the industry. One Bayou Lafourche planter expressed the mood of the times in his diary entry: "All is dark and dreary in the future, and the present is no better."<sup>14</sup> Dev-

<sup>12</sup> "Brief Reminiscences of the Life of an Ex-Overseer, Agent and Sugar Planter," *Louisiana Sugar Bowl* (New Iberia, La.), Dec. 10, 1874.

<sup>13</sup> *New Orleans Price Current*, Sept. 1, 1866; *De Bow's Review*, Series I, after the War (1866), 201; *ibid.*, II (1866), 416; *ibid.*, IV (1867), 237-38.

<sup>14</sup> A. Franklin Pugh, Diary, Oct. 24, 1865 (Louisiana State University).

astation throughout the region was almost beyond description. Sugarhouses and machinery were wrecked, livestock driven away, agricultural implements lost or worn out, farm buildings in bad repair, levees broken, and drainage ditches so filled up as to make successful cultivation of cane impossible without redigging. Extensive renovation of the sugar region was needed at the very time that planters and Negro freedmen were experiencing the frustrations and difficulties of their new relationship.

Adjustment to a new order of society, necessitating abandonment of old ideas, habits, convictions, and prejudices, was too much for some, and they fell victims to the violent forces of readjustment. Many a planter who had served his family and community well in his ordered ante bellum status experienced a gradual character disintegration in the years after the war. With work of every kind to be done, many who had never worked in the fields could not at first bring themselves to undertake the hard physical labor that had heretofore been done by their slaves. Rather they stayed at home all day "brooding over the present troubles and those that must come."<sup>15</sup>

In any appraisal of the revival of the sugar industry, it must be kept in mind that in the first postwar decade the prewar planter group was still predominant. This group, knowing only the plantation-slave economy, naturally sought to re-establish in the New South an economy and society patterned after that of the Old South. Efforts to induce them to abolish the plantation system and sell their land to small farmers generally failed. One ante bellum planter, with uncommon perception, described his fellow planter in 1878 as follows:<sup>16</sup>

More cotton, rice and sugar cane is now the mania of the planter. He talks, thinks and dreams of nothing else . . . . He cannot leave the well-worn ruts used by his fathers, and sees but a wilderness beyond them, where jack o'lanterns are ever ready to lure him to destruction. Born a planter, he lives a planter and will die a planter. If ever farming becomes paying and popular here, a race trained to it from youth must inaugurate it.

The most pressing problem in the revival of the sugar industry was that of securing an adequate labor force. In the war and early post-war years, in the absence of liquid capital, sugar planters like cotton

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<sup>15</sup> A. Franklin Pugh, Diary, Jan. 31, 1866 (University of Texas; some years of the diary are at Texas and some at Louisiana State University).

<sup>16</sup> *Louisiana Sugar Bowl*, Jan. 17, 1878.

planters tried the share system whereby the Negro workers received as compensation for their labor a share of the proceeds of the crop. Almost from the beginning, this system proved unsatisfactory. Teams were abused, farm implements destroyed, drainage ditches allowed to fill up, and the crops from time to time so badly neglected as to endanger the harvest.<sup>17</sup>

Convinced that the free Negro would not work without compulsion, as early as 1866 sugar planters looked to immigration from other parts of the United States, Europe, and Asia as a solution to the labor problem. Under planter urging, state bureaus of immigration were established, immigration companies were incorporated, and labor contractors offered to provide immigrant workers on a commission basis. As a result of such efforts, a few hundred German, Spanish, Portuguese, and Italian immigrants came to the sugar region. In general, planters expressed satisfaction with the work of the white immigrants as wage laborers. Although constantly urged by the press of the region to divide their plantations and sell land to small farmers for cane cultivation, planters were generally unresponsive. Moreover, they turned deaf ears to the admonitions that comfortable living quarters must be provided for the white immigrants if they were to remain as laborers on the plantations. An editor of a leading journal advised the planters in 1872 that while Germans were willing to work they "are not accustomed to being treated like negroes and hence have left some plantations where employed."<sup>18</sup>

Sugar planters, with their prewar heritage, sought to re-establish the plantation system with gang labor and an expensive sugar factory. If white immigrants could not be secured, perhaps Chinese, reputed to be "docile workers," could be imported to take the place of the former Negro laborer. Despite vigorous objection from some quarters to the importation of "heathen Chinese," in the years 1869-1873 a few hundred Chinese workers were brought to the cane fields of south Louisiana where they received about \$26 a month and quarters. But this effort to supplant the Negro likewise failed. Not only did the Chinese break their contracts and move from plantation to plantation, but more important the planters were disappointed with the Chinaman as a sugar cane worker. As one observer put it, "He can't

<sup>17</sup> See especially *Louisiana Sugar Bowl*, 1870-1874, and A. Franklin Pugh Papers (University of Texas).

<sup>18</sup> *Louisiana Sugar Bowl*, Feb. 22, 1872.

plow, he can't run a cultivator, he can't steer a mule, but otherwise, his performances are admirable!"<sup>19</sup>

While it is true that a few hundred reliable and thrifty white tenants continued to cultivate portions of plantations in the 1870's and 1880's and some eventually became landowners, the sugar planter could not divest himself of his belief that sugar could be successfully produced only by large plantations using gang labor. Even those who were willing to concede the desirability of white tenants and small cane farmers argued that whether planters liked it or not, it was necessary to utilize the Negro under the wage system as the major source of labor. Moreover, as adjustments were made to the new situation, the excessive labor turnover and the bitter dissatisfaction of both planter and freedman in the early postwar years were diminished. More and more planters in the seventies expressed satisfaction with the work of the Negro. Early in 1882 the editor of the New Iberia *Louisiana Sugar Bowl* declared, "There have been many conspicuous successes with free Negroes and *not a solitary one with any other.*"<sup>20</sup>

In fact, each field hand cultivated fully as much if not more under freedom than under slavery. Moreover, sugar yields indicate that the Negro was not a failure as a worker under freedom. While data are not sufficiently conclusive to make categorical statements as to the quality of the Negro's work, it is probable that so long as he remained at the job he worked equally as well as under slavery. Other factors largely account for the widespread claims that the Negro would not work and that labor costs under the new system were ruinously high. Whereas many women and children had worked in the cane fields in ante bellum years, this was generally not the case in the early postwar period. The serious shortage of labor, the high wages, and the undue mobility of labor that attended the early years of adjustment to freedom were the major causes of the high labor cost rather than the inefficiency of the individual Negro under his new status.<sup>21</sup>

Despite the difficulties of a scarcity of capital and the problems of adjustment to a new labor system, recovery of the southern sugar industry in the first postwar decade was impressive. From the low figure of 5,000 tons in 1864, production climbed to more than 72,000 tons in 1870 and in 1880 reached 140,000 tons. Although the 1880

<sup>19</sup> *Ibid.*, Mar. 2, 1882.

<sup>20</sup> *Loc. cit.*

<sup>21</sup> *Ibid.*, July, 1871-Sept. 1872, *passim*.

crop was only 60 per cent of the record crop of 1861, the substantial recovery since the dark years of 1864 and 1865 indicated that the industry was again ready to move forward as it had in the 1850's.<sup>22</sup>

The postwar industry, despite the freeing of the slaves, had been re-established on the prewar basis of large plantations with Negro gang labor and each plantation operating its own sugar mill. Time was to prove that the industry could not survive on that basis. A few of the planters foresaw this in the 1870's and realized that cane cultivation and sugar manufacturing were not necessarily inseparable and that a sound sugar economy could be built on the basis of small and medium-sized farms supplying large mills with cane. Planters could not be expected to forget their old experiences, however, and the ante bellum plantation concept still dominated their thinking and action in the first postwar generation. The Civil War, then, had all but wiped out the industry, but no revolutionary changes in the nature of the industry attended its revival; rather it reverted to the prewar pattern.

In the years from 1877 to 1910, however, a modern sugar industry, drastically different from that of the Old South, developed in the Louisiana-Texas region largely as a result of the fundamental economic factors of high costs and low prices. Increasing production of sugar in Cuba and other areas forced world prices steadily downward. Falling raw sugar prices in the United States market—from an 8½ cent figure in 1874 to an average of 6½ cents in the 1880's and slightly under 4 cents in the years 1890 to 1910—accompanied by high labor costs and the heavy capital requirements of the large modern raw sugar factory made revolutionary adjustments necessary.

The major factors that transformed an essentially ante bellum industry into a modern one were: (1) the establishment of several agencies for the advancement of the industry including the Louisiana Sugar Planters' Association, the Louisiana state experiment station, the sugar school, and the *Louisiana Planter and Sugar Manufacturer*, organ of the cane sugar industry; (2) the introduction of the central factory system whereby the functions of cane cultivation and sugar manufacture were separated; (3) technological changes in cultivation and manufacture; (4) the partial solution of the critical labor shortage; and (5) improvements in marketing practices.<sup>23</sup>

<sup>22</sup> Louis Bouchereau and Alcée Bouchereau, *Statement of the Sugar and Rice Crops Made in Louisiana* (New Orleans, 1868-1916), *passim*.

<sup>23</sup> Abundant material on the above developments is contained in the *Louisiana Planter and Sugar Manufacturer* (New Orleans, 1888-1929).

The Louisiana Sugar Planters' Association, established in 1877 by a group of prominent planters, became the dynamic force in the establishment of the modern industry. In its vigorous pressure for adequate import duties, investigation of problems of cane culture and sugar manufacture, and above all in its vital leadership in the founding of the state agricultural experiment station in 1885 and the Audubon Sugar School in 1891, the Sugar Planters' Association made possible the survival of the southern sugar industry on a sound economic basis.<sup>24</sup>

As cane acreage expanded in the 1870's and 1880's, the shortages of capital and labor led some planters to urge the establishment of a central factory system in which farmers would grow cane and sell it to large factories for manufacture into sugar. The adoption of a system so much at variance with established procedures could not be accomplished quickly or without encountering perplexing problems of adjustment. One of the most persistent of these, the determination of a fair price for both buyer and seller of cane, was partly settled in the 1880's by the practice of buying cane on a "scale" plan with the price per ton being determined by the current price of sugar. Another deterrent to the central factory movement was the difficulty of securing a sufficient quantity of cane well distributed through the grinding season. In time, this too was solved by long-term contracts between factories and farmers.

Adoption of the central factory system resulted in a pronounced consolidation of sugar factories in the years 1880-1910. Whereas there were about 1,200 factories in the Louisiana-Texas region in 1880, in 1910 there were only 224 but each produced more than 1,500 tons of sugar as compared with a mere 110 tons in 1880. Supplying the central factories with cane were a sizable number of large planters, an increasingly large group of white tenants, and a few small cane farmers. Despite continuing efforts to secure white immigrants, the cane region still depended primarily upon Negro wage laborers. The dwindling supply of such labor available for work in the cane fields, however, made it apparent by 1910 that more small cane farmers and tenants selling their cane to large factories offered the only solution to an industry that could no longer look forward to expansion without an augmented labor force.<sup>25</sup>

<sup>24</sup> Louisiana Sugar Planters' Association, Minutes, 1877-1890, *passim* (Louisiana State University).

<sup>25</sup> Bouchereau, *Statement of Sugar and Rice Crops, 1880-1910, passim*.

Equally as significant as the central factory in the rise of the modern sugar industry in the South were the impressive advances in agriculture and manufacturing made in the last two decades of the nineteenth century. It was in the use of fertilizers, improved agricultural implements, and new cane varieties that the culture of cane was advanced most significantly in the period.

In the field of manufacturing the most notable advances were in improvements in sugar mills for the more effective extraction of the juice. Although no revolutionary developments were made in the sugar making process itself, a number of improvements were adopted. In the raw sugar factory of the twentieth century, applied science played a key role. Higher yields, greater sugar recovery, a better product, and economy of operation were the fruits of the new sugar industry that emerged in the South as the nineteenth century came to a close.

One unknown wag put the advances in sugar manufacture into verse form in "The Nigger's Wail":<sup>26</sup>

Befo' de wah, when de sugar we make  
Was biled in de ole fashioned kettle,  
De grindin' time was a merry-go-round  
For us niggers, bofe big and little;  
But now dese mens, wid the spy glass and chubes,  
Biles de juice in a cast iron drum;  
Dey makes all de stuff into crystals and cubes,  
And leaves no merlasses for rum.

De boss tink he know mo' dan ebber befo',  
Since dem kemmis done show him some nonsense;  
But de nigger say, 'Hi'  
We goan all of us die,  
For we got to drink whiskey in consikence!

By the opening of the twentieth century, the gradual disappearance of the old planter group and the rise of the new together with the other forces that had changed the organization and technology of the industry had largely destroyed the romance of the region. Gone were the royal days of old plantation life with their house parties, hunting,

<sup>26</sup> *Louisiana Planter and Sugar Manufacturer*, III (1889), 277.

and gaming parties. Planters who survived the revolution sought to adapt themselves to the demands of the new era. They learned new ways, abandoned expensive pleasures, practiced economy, and held on to their homes and plantations; in some instances they successfully built new fortunes on the ruins of their ante bellum ones. But the modern southern sugar industry of the twentieth century faced the necessity of continuing adjustment to the inexorable economic forces of downward sugar prices and higher labor costs. Survival could be achieved only through the strictest economy and continued technological advances.

In resumé, it may be reaffirmed that, apart from property destruction, the Civil War was responsible for only one substantial change in the southern sugar industry, the substitution of free labor for slave. In view of the fact that whether slave or free, the labor system was Negro gang labor, the importance of even this change may be exaggerated. Nor is there any evidence to indicate that radical Reconstruction formed any real obstacle to recovery. The great changes that did occur in the southern sugar industry were the product of factors unrelated to either the war or Reconstruction.

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## A GERMAN EIGHTEENTH-CENTURY IRON WORKS DURING ITS FIRST HUNDRED YEARS:

### Notes Contributing to the Unwritten History of European Aristocratic Business Leadership—II

#### V

#### THE WORKS' SPIRIT AND ITS OUTGROWTH: INNOVATION AND IMPROVEMENT IN THE ERA OF THE ELDER EINSIEDEL (1776-1804)

If one remembers Count Detlev von Einsiedel's character and achievements, as described in the first installment of this article,<sup>42</sup> one will not be surprised that under his leadership a spirit of scientific enlightenment, of restless improvement, and of innovation came to permeate the Lauchhammer Works so that it became one of the leading German iron works.<sup>43</sup> To be sure, genuine primary innovation was rare, as it is by necessity. Only in the case of casting figures and in that of enameling iron utensils was something brought into existence in the Lauchhammer plants that had never existed before. But on top of that, there were numerous derivative innovations,<sup>44</sup> i.e., innovations as far as that particular part of Germany was concerned. Or to put it differently, the elder Count Einsiedel transferred to Saxony achievements made in the most advanced areas of eighteenth-century iron industry. It is from this point of view that the following presentation must be read, a presentation in which the Count's primary innovations, previously described, are not mentioned again.

The new scientific spirit found expression, for example, in 1782 when, with the help of the experienced mining surveyor, Gläser, a

<sup>42</sup> See *Bulletin of the Business Historical Society*, XXVII (June, 1953), 73-74.

<sup>43</sup> Trautscholdt expressed this fact in the following charming and old-fashioned way which cannot be translated. He praised that "seit der Leitung des Herrn Conferenzministers ein geistiges Leben das ganze Geschäft beseelte."

<sup>44</sup> For the terminology see my article "Innovation in Business" in *The American Journal of Economics and Sociology*, X (1951), 285 ff.

laboratory was built for the testing of iron ore and crude iron. (Incidentally, since in 1811, if not at an earlier date, analyses of wrought iron, produced in the forges, were added to its program, the laboratory had to be enlarged in 1818.) Moreover, in 1791, when a recently built furnace received a new lining, the mystery with which the older masters had surrounded such operations was discarded and the work done according to scientific principles. Similarly, by 1805, the Works' technical staff did away with the "mysteries" of the forge workers, that is to say, with their traditional procedures which were shrouded in mystery. Opposition thereto was overcome by various measures, especially by training new workers in a progressive spirit. On the top administrative level that same spirit was in evidence also. By 1795 the Count was learning about the patents which Henry Cort and Sir William Parnell had received in England in 1784 and 1787, respectively. These famous patents, which ushered in the era of puddling, aimed at the improvement of the reverberatory furnace, a type of furnace in which the iron to be refined does not come in contact with the fuel, so that mineral fuel can be used. The reverberated (reflected) heat melts the iron.<sup>45</sup> About ten years elapsed before the ideas, embodied in those patents, reached Count Einsiedel, who seems to have been the first iron manufacturer in Germany to recognize the importance of the innovation. He built an experimental reverberatory furnace as early as 1796/97 and in 1798 replaced it with a permanent one. Professor Lampadius of the Freiberg school of mining, then considered an authority, who supervised at various times experiments and attempts at improvement at the Lauchhammer Works, was responsible for those experiments with the reverberatory furnace also, and he published the results. But he labored under incorrect chemical concepts, and his attempt at puddling with charcoal ended in failure and had to be abandoned.<sup>46</sup> The heat producible by charcoal or wood was not sufficiently high, nor was the pressure provided by the available blower strong enough to succeed. Nevertheless, these endeavors were noble and noteworthy alike. Less striking but more successful was the Works' venture of using liquid furnace cinders for making bricks

<sup>45</sup> Ludwig Beck, *Geschichte des Eisens in technischer und kulturgeschichtlicher Beziehung* (Braunschweig, 1893-1903), IV, 617.

<sup>46</sup> Wilhelm August Lampadius, *Handbuch der allgemeinen Hüttenkunde, des zweyten Theiles vierter Band enthält die hüttenmännische Benutzung der Eisenerze überhaupt, so wie der Frischprocesse und der Stahlfabrikation* (Göttingen, 1810), 98 ff.; reported also by Beck, *op. cit.*, III, 699.

(1796), both for sale and use in the plants; iron molds were used for that purpose, and the process was improved in 1813.

The failure of the just-mentioned effort to puddle may have been incidental to the failure of another enterprise of the Count which, in turn, may have induced the experiments.<sup>47</sup> In the nearby area of Hainichen there were three seams of mineral coal, the exploitation of which had been undertaken in 1789 by two noblemen. One of the men gave up as early as 1790, while the other sold his mining rights to Count Einsiedel. The latter, going into the enterprise with his accustomed energy, was at first successful but later ran into difficulties: water flooded the mine. After a loss of 74,000 talers he gave up and sold out, too early indeed, for the buyer achieved considerable success. It is suggested that the attempt at puddling and this mining venture were somehow connected and so were the failures.

Experiments and innovations of such character were supplemented by steady improvement of the plants. In 1789, as already mentioned, the construction of a new furnace was started. This furnace (a round one) was higher than the one which it replaced and which was dismantled in 1796, and it was to serve extensively in the foundry business. The foundry business' expansion, in turn, necessitated the erection of new buildings for the furnace and the foundry and for the production of the molds. Built over a number of years, the furnace embodied remarkable technical progress for which the forge manager, Lohrisch, was responsible. The outer walls were strengthened by built-in iron lattice-work; hearth and bosh were reshaped so as to obtain higher temperatures. The hearth installed in 1791 no longer consisted of masonry, as was customary, but of a special mass made up of crushed and burnt gravel and clay stamped into iron boxes.<sup>48</sup> These, when filled, were used like bricks.<sup>49</sup> Such mass had never been used before in Germany. The experiment was so successful that ultimately both the bosh and stack of the new furnace were built of the same material. In 1793/94 the water supply of the furnace was improved, and in 1795 and 1796, respectively, there were installed a new water-driven cylindrical blower and a new box blower.<sup>50</sup> Yet a still

<sup>47</sup> *200 Jahre Lauchhammer, 1725-1925* (p. p. [1925]), 24.

<sup>48</sup> Lampadius, *op. cit.*, 304.

<sup>49</sup> See Beck, *op. cit.*, III, 616, 731, 732. On the last-named page there are two drawings of the furnace.

<sup>50</sup> Lampadius, *op. cit.*, 297, reports that by 1800 a second furnace was built and held in reserve.

more important step remained to be done, a first step toward replacing human labor by machines. In 1797 the charge bridge was removed and thereafter the charging of the furnace was undertaken with the help of a water-driven hoist. For lack of sufficient water power it was not possible to go as far as was desired, and human muscles were still needed, at least occasionally, for supplementing water power in the hoisting process. In 1800 the cinder dump was leveled to make room for a coal yard and a building for coal storage. That building was actually erected over the years from 1801 through 1804.

It goes without saying that attention was also devoted to the production of wrought iron. In 1781 the Mittelhammer added bar iron to its program, but in the forges the policy of improvement did not start in earnest until about 1796. In that year a beginning was made in the forge at Spreewitz; in 1800 the Unterhammer was rebuilt and received a new blower; and in 1801 the Burghammer obtained installations for the production of bar iron. By that time the last-named plant gave up its earlier agricultural production on the estate to which it belonged. Specializing in industrial pursuits it leased its land to small peasants who in return had to keep eleven horses for the transportation requirements of the forge.

But the greatest of all the achievements of the period remains to be described. The Lauchhammer Works is located in a rolling, but not mountainous, country which was swampy in the eighteenth and early nineteenth centuries. Consequently, lack of water power was a factor retarding the Works' growth during its first hundred years. In the Löwendal era, as has been described before, water rights were acquired from time to time, and once the elder Count Einsiedel had taken over, much attention was paid to that crucial problem. Improvements in the water supply or in the sources thereof are recorded for 1778, 1793/94, 1795, 1796, and every year between 1798 and 1802. (Incidentally, in the latter year the first well was drilled in Lauchhammer so that drinking water became available on the spot; previously it had been carted into the settlement and plants.) Nevertheless, the problem of a limited water supply remained. Thus in the late 1790's the Count was studying the possibility of installing an atmospheric engine.<sup>51</sup>

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<sup>51</sup> The following is based on an anonymously published article "Beiträge zur Geschichte des Eisens" in *Stahl und Eisen*, XXV (1905), 1231-1234, 1300-1305. The article is based on archival material, much of which is reprinted therein.

As early as 1798, one of the leading men of the Lauchhammer Works, traveling in northwestern Germany in the interest of the Works, was dispatched to the Grafschaft Mansfeld. He was to contact Carl Friedrich Bückling (1750-1812), the outstanding Prussian mining official, who was then in charge of the work on machines of the Prussian Department of Mines and Metallurgy (Maschinenwesen des Preussischen Berg-und Hütten-Departments).<sup>52</sup> Thus we find another of the historical names of German eighteenth-century technology in the records of the Lauchhammer Works. Bückling received a letter and the draft of an engine, which seems to have been designed by the Count himself, and his advice was requested. But nothing came of these initial negotiations.

In 1802, however, the matter was taken up again, and it was decided to add to the existing water power a new source of power, a steam engine to drive the blower of the furnace.<sup>53</sup> It is not known whether this decision was precipitated by the discovery of lignite coal on the estate. Those outercropping deposits belonged to the extraordinarily large and rich lignite coal beds which still cover most of eastern central Germany and have been exploited on the largest scale for about the last hundred years.<sup>54</sup> Be that as it may, the Count took action, and Bückling personally went to Lauchhammer, became familiar with the situation, and then suggested installing a steam engine. This steam engine was to drive a pump at the mill pond, in order to increase the available water power. The proposal was well in line with the technical thinking of the time, steam engines then being very widely used for driving pumps; as a matter of fact, that was the purpose for which the earliest atmospheric engines had been used everywhere. Bückling's plan was adopted and a contract made in December of 1802.

Under this contract Bückling undertook to have an engine built according to Watt's principles, probably in the Royal Prussian machine shop in Rothenburg on the Saale. This machine shop was then managed by the English Quaker, William Richard, whom Bückling,

<sup>52</sup> See my essay, "The Leaders of the German Steam Engine Industry during the First Hundred Years" in *Journal of Economic History*, IV (1944), 122, 123.

<sup>53</sup> According to Lampadius, *op. cit.*, 305, in periods of draught the blower was then worked by man or animal power.

<sup>54</sup> Deutscher Braunkohlenverein, E. V., Halle (Saale), *Festschrift zum 50jährigen Bestehen des . . . 1885-1935* (Halle, 1935), 291 ff.

while in that country, had induced to emigrate to Prussia in violation of the British law. Richard had been taken into Prussian civil service where he made an excellent record as one of the earliest German engine builders. The engine for Lauchhammer cost 12,560 Prussian talers including the installation, a price which was figured on the basis of ten talers per square inch<sup>55</sup> of cylinder surface, and Bückling was contractually bound to buy from the Lauchhammer Works at the regular sales prices the cast and forged parts needed for the engine. By the end of 1803 the machine had been completed and shipped by water to Grödel on the Elbe, at a cost of 181 talers, 15 groschens and 10 pfennigs plus a gratuity of 2 talers for the boatmen. Trautscholdt himself went to Grödel to meet the engine and to supervise the re-shipment. The incidental expense amounted to 8 talers, 13 groschens and 9 pfennigs which included a tip to the hands who had helped to unload and reload the cargo. The Saxon customs duty had been abated.

Bückling was now asked to come in person to assemble and install the machine. But instead of coming he dispatched a competent worker who was paid, probably on account of the engine shop, 3 talers per day besides receiving free lodging, bed, and firewood. He was to have his meals at the Works' tavern and to pay therefor out of his own pocket. But the worker did not like this idea, requested free board, and in the end actually received another 2 talers to recompense him for that expense. This episode is indicative of the worker's importance and of his awareness of his worth. He could more or less set his terms. Moreover, when the job was finished, Lauchhammer paid him a "douceur" of no less than 100 talers. While this man labored on assembling and installing the machine, the Works had to build the enginehouse. For that purpose a contract was made with a mason according to which he received all building material free of charge and was paid 3 groschens per "*Elle*," i.e., for each 0.5664 meter, of wall completed. The mason, in turn, had to remunerate his hands; but the Works hired extra help which prepared the mortar in order to guarantee its good quality.

When everything was completed, the Saxon mining official, Karl Gottfried Baldauf, inspected the engine and accepted it for the Works. Again we meet in its records one of the outstanding German techni-

<sup>55</sup> Actually per *Zoll*, but one *Zoll* corresponds approximately to one inch.

cians of the period. Baldauf (about 1750-1811),<sup>56</sup> well-known at Lauchhammer, was at that time an engine master (*Kunstmeister*)<sup>57</sup> in Freiberg. In the beginning the machine worked to the Count's satisfaction, except that the fuel consumption was twice as high as computed. But in the long run the Works' management was less pleased and so in 1812 sold the engine for only 6,200 talers to the salt works at Dürrenberg.

An important question remains to be answered in this section. How did modern technical and scientific ideas reach the Lauchhammer plants in the era of the elder Einsiedel? There were actually three ways: First, the Count acquired a library of pertinent technical books.<sup>58</sup> Secondly, as mentioned before, he relied on advisers and was lucky in the selection. Immediately after having taken over the administration of the enterprise, he called in the highly recommended Saxon mining official, Gläser. The latter possessed intimate knowledge of iron works in several parts of Germany and was therefore qualified to make comparisons. Gläser investigated and thoroughly revamped the Lauchhammer production methods; he was at the same time impressed by the possibilities of the Works, and rightly so. Later Freiherr von Heinitz, soon to become a Prussian minister, was consulted, and among the Count's other advisers were such men as the renowned mineralogist and geologist, Abraham Gottlob Werner (1750-1817), professor at the famous school of mining in Freiberg, Saxony, and, as we have seen, the chemist, Professor Wilhelm August Lampadius (1772-1842), then teaching at the same school.<sup>59</sup> Both men were leading scientists in their time; and, incidentally, the Count went far in assisting Lampadius in his search for theoretical knowledge. The third method was absorption of ideas by travel which among other advantages had that of enabling the traveler to compare Lauchhammer methods with those used in other similar enterprises.

As early as 1788 the previously mentioned Johann Friederich Lohrisch, a leading technician of the Works (1778-1788 *Schichtmeister*; 1789-1798, forge manager), was sent to Franconia, Suevia, and

<sup>56</sup> See below page 148.

<sup>57</sup> To avoid misunderstandings, the eighteenth-century term *Kunstmeister* denoted an engineer and engine designer, not a machine tender.

<sup>58</sup> See Lampadius, *op. cit.*, 298. Incidentally he also collected minerals and samples of products of furnaces and forges.

<sup>59</sup> See *Festschrift zum hundertjährigen Jubiläum der Königl. Sächs. Bergakademie zu Freiberg am 30. July, 1866* (Dresden, 1866), 8 ff., 17 ff.

thence into the areas of the then advanced Alpine iron industry, namely, Salzburg, Carinthia, Styria, and Carniola, for visiting mines and iron-producing plants. He returned by way of Bohemia. In 1792 he was sent on another trip, this time to Silesia, which had experienced a remarkable growth and development of its mining and iron industry under the administration of Prussian government officials. The instructions which Lohrisch received before going on that trip, on which he was accompanied by the already mentioned Saxon mining official, Baldauf, have survived and give a good idea of his program.<sup>60</sup> In 1796 another leading employee, the *Conducteur* Hasse, was dispatched to the Harz Mountains. In 1797 the elder Count Einsiedel himself, accompanied by a forge clerk, made a trip to Silesia; and in the next year we find Hasse once more in Lower Saxony and the Harz Mountains, proceeding thence to the Grafschaft Mansfeld, an important and advanced mining area where Hasse was to study the use of steam engines. On that trip, as mentioned above, he made the contact with Bückling which led to the acquisition of the Lauchhammer Works' first steam engine. Finally, in 1811 the younger Einsiedel and Trautscholdt traveled to Styria and Silesia.

After the Napoleonic Wars, traveling was taken up again: in 1819 the forge manager, George, accompanied a Saxon mining official to Sweden and Norway, returning the following year with an elaborate journal, as was customary. In the year 1820, after a rolling and slitting mill had been ordered, two men were sent to Silesia to study the operation of such machines. In 1821 Trautscholdt himself went to Teplitz in Bohemia and was permitted to visit the Horowitz iron works of Count Wrbna; their low coal consumption was a matter of envy and a goal to be achieved. It seems that in 1822 a forge master and a skilled worker were borrowed from that enterprise and worked for some while in Lauchhammer, Gröditz, and Burghammer; however, the source material is not conclusive, and the two Bohemian workers may have just been hired. (But if so, how were they selected and contacted?) It became evident from their performance that the low coal consumption in the Wrbna plants was due to the kind of iron worked there; nevertheless, the Bohemian workers showed the way to coal savings. In the meantime one of the young trainees of the

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<sup>60</sup> The instructions are reprinted by Wappler, "Oberberghauptmann von Trebra und die drei ersten sächsischen Kunstmeister" in *Mitteilungen des Freiberger Altertumsvereins*, no. 41 (1905), 141 ff.

Lauchhammer Works (Alex by name) was also sent on a trip to Bohemia.

Of course, since such inspections were permitted, the Lauchhammer Works had to reciprocate; as a matter of fact, we learn that the plants received a good many and often distinguished visitors. In 1782, for example, the Prussian mining officials, Freiherr von Heinitz and Count Reden, were at Lauchhammer.

In this connection it is easy to explain the advantages enjoyed by aristocratic enterprisers at this particular juncture. Craftsmen, of course, considered all the operations of their trades as "mysteries" and would not disclose them. Merchants grew up in a similar atmosphere, and if and when they entered manufacturing, they did not behave better than craftsmen. The prevailing spirit of competition made it impossible for them to act otherwise. Aristocrats lived in an entirely different world. For a nobleman the idea of competition with another nobleman was unthinkable, although their factors might compete in the market. Many of the aristocrats, when developing their estates through industrial enterprises, thought of improvement just as much as of income, a fact which determined their attitude. These men had easy access to other noblemen and to leading statesmen and government officials who in the era of Mercantilism did so much to promote industry in the territories for which they were responsible. Thus before the transmittal of technical and scientific knowledge had become institutionalized, noblemen had in certain fields the best opportunities for studying technical and scientific progress wherever achieved, because they could obtain admission everywhere in government and nobility-owned enterprises. Consequently their customary way of acquiring pertinent knowledge was by traveling themselves or by sending the leading men in their technical staffs on extensive trips.

#### IN THE ERA OF EINSIEDEL, JR.-TRAUTSCHOLDT (1805-1825)

Even from the scanty information which we possess we can draw the conclusion that by 1805 the spirit of the Lauchhammer Works was changing in some respect, although the principles which had determined its policy remained unaltered. Count Detlev von Einsiedel, Jr., then assumed the ultimate power of decision, but he co-operated so closely with his general manager, Christian Friedrich Trautscholdt, that it is impossible to determine exactly who of them contributed

what. Yet it appears that it was rather Trautscholdt's spirit which was now becoming dominant in the enterprise. (The young Count, gaining at that time more and more political influence, although visiting the plants regularly, lived in Dresden and spent only the summers at Mückenberg Castle.) One change is obvious: the atmosphere in the Works became a more mercantile one. As will be pointed out later, beginning by 1800 a whole series of modern business devices was introduced in the enterprise, obviously under Trautscholdt's influence, so that by 1810 the Lauchhammer Works was approaching the character of a business concern, while in the elder Count Einsiedel's era it had been rather part and parcel of the estate of a very progressive and technical-minded noble lord and landowner.

To be sure, what underwent no change was the interest in improvement and innovation. The younger Einsiedel and his right-hand man, Trautscholdt, were confronted with a major problem which must have come up in the later years of the elder Einsiedel: forests and mines in the neighborhood of the Works were giving out. Securing a current supply of the basic raw materials for the future was the pressing need when they took over; and they tackled the problem immediately. As to the ore supply, the older mines were reworked, poorer ore taken out, and melted down, while at the same time new bog ore mines at a distance from the Works were secured and opened up. In addition gangue ore was brought in, probably from the Saxon Erzgebirge, that is to say, a kind of ore occurring in veins and accompanied by other minerals. Such ore was tried with a view to determining whether it could be used profitably in the Works' furnace. The experiments seem to have been of no avail in the first instance.

As to charcoal, an additional estate rich in timber was acquired; large tracts of potential woodlands were drained and, together with land which had lain unused, planted to pines and firs. Moreover, birches and alders came to be used for making charcoal; and contracts were concluded with other estate owners for the delivery of that fuel. These measures were supplemented by such actions as would lead to a saving of charcoal: peat was from then on used in the manufacture of cinder bricks, in the enamel plant, and in every other production in which charcoal was not indispensable for technical reasons. Moreover savings of fuel were achieved, as will be discussed shortly. On the other hand, the burning of charcoal was better organized and supervised.

In this context it can be understood why the younger Einsiedel, in

his capacity as a government administrator, was so eager to promote the improvement of the area on the largest scale. Since the middle of the eighteenth century the valley of the Schwarze Elster, the area in which Lauchhammer is located, had become swampy; it was to be drained again with government assistance, so that large areas would become available for agricultural purposes and for exploitation as forest lands. Preparatory steps were actually taken, but at that point the Wars of Liberation interfered, and under the Peace Treaty of 1815 the valley was ceded by Saxony to Prussia. A member of the Einsiedel family then shifted pressure to Berlin, but the actual drainage of the region came only in the 1850's and had no direct influence on the Works' future.

The improvement of the water supply, especially by the drainage of the Count's estates, remained a concern of the Works' administration, as it had been before, and measures to that effect were now being facilitated by a shift of the responsibilities therefor. Actions toward improving the water supply were taken in 1805, 1806, 1810, 1813.

So much about the improvement of the raw-material situation and about such matters as were determined by raw-material needs. In addition, much attention was given to the betterment of the furnace and the foundry equipment. (Since the furnace was fired with charcoal until after the close of the period under investigation, it could during that time still serve as a foundry.) Most important among the improvements of the furnace were the installation of new blowers to be worked by a steam engine (1807) and the reconstruction of the furnace's bosh, a step which led to a considerable saving of charcoal. Moreover, the foundry building received a new foundation; another reverberatory furnace was put into operation in 1813, more patterns and molds were acquired (1807, 1811), and loam casting was replaced more and more by sand casting. Among the new products which it was possible to put on the market were enameled pipes (1808), a still, larger than any the Works had made before (1810), and clocks, the first of which had been produced in 1805. The clocks were rather popular, although expensive, the price being 140 Prussian talers without face and bell.<sup>61</sup> In 1811 the foundry received a drying chamber and hoisting gear.

These changes were paralleled by the development of the forges:

<sup>61</sup> *Stahl und Eisen*, XXV (1905), 1,302.

In 1805, 1808, 1810, 1811, and 1812 the Spreewitz, Burghammer, Grünwald and Gröditz plants were partly rebuilt or enlarged or improved. In 1808, 1811, and 1812 the Oberhammer, Unterhammer, and the forge at Grünwald received new blowers.

Still more important were expansions along modern lines, some of them representing derivative innovations: 1807 witnessed the erection of an annealing furnace so that malleable iron could be produced; in 1808 and 1813, respectively, the Oberhammer and the Lauchhammer plants received reverberatory furnaces; the year 1809 gave the Works a larger boring machine which must have resulted in greater efficiency in the boring of cannon tubes and engine cylinders; finally the record for 1812 shows the establishment of what was called a *Schlosserei*, literally translated a blacksmith's workshop, but I think it was rather a small machine shop, designated by an old-fashioned name.

At this point of the Works' development the Wars of Liberation began, and in the course of the year 1813 Lauchhammer was occupied by Russian and Prussian troops. But the plants were lucky; there was no looting and the damage sustained remained small, partly because loyal workers had succeeded in hiding a good deal of ammunition which the enterprise had produced and which had not been shipped prior to the entry of the enemy troops. (The reader is reminded that the King of Saxony was Napoleon's most loyal ally.) Cossacks took three work horses, grape shots were attached, and forged iron parts requisitioned for the building of a pontoon bridge over the Elbe; some molds which served for the casting of ammunition were deliberately destroyed; and some experienced foundry workers were drafted into military service. At the present time we would consider this kind of war almost idyllic.

The peace treaty of 1815 brought the enterprise more serious problems: most of the Lauchhammer Works' plants were in areas ceded to Prussia and only those at Gröditz and some mines remained in the Kingdom of Saxony. In 1818 a new Prussian customs tariff went into effect which opened the markets of the latter realm to Lauchhammer products. This change proved favorable for the distribution of cast iron and articles made therefrom, while those from wrought iron had now to face the competition of Brandenburg and Silesian iron works. Moreover, the Prussian tariff of 1818 put an export duty on crude iron (a hangover from the Mercantilist era) which made it impossible to provide the (Saxon) Gröditz plant with its raw material. For years thereafter this plant was forced to work on the basis of scrap iron of

which several thousand centners were bought. By that time the sale in Saxony of the now Prussian Lauchhammer Works' products was impeded by a Saxon customs duty of 16 groschens per 100 pounds of wrought iron and 6 groschens per 100 pounds of cast iron (both rates also applying to products made therefrom). In 1822 however, by the Saxon "mandate" of March 23, these rates were reduced to 7 and 1 groschens, respectively, if the iron was imported from works located in former Saxon territories. This measure, among others, earned the younger Einsiedel the alluded-to denunciation of having abused his political power in his private interest, an accusation which was leveled against him by his Saxon competitors, of course. How true it was cannot be determined on the basis of the sources available here.<sup>62</sup>

By that time the Lauchhammer Works had acquired a reputation for the high quality of its products, which Trautscholdt assigned to the following measures. First, management developed the policy of installing at the forges continuously new and stronger blowers (concurrently, there seems to have been the tendency to replace box blowers by cylindrical ones). Secondly, there was a careful selection of good raw materials. Limestone of poor quality was replaced by better; and the quality of charcoal was improved. Only such bog ore as underlay meadows was taken and, once mined, well handled; none was mined in swamps. Ores were permitted to lie for several years, so as to undergo a process of oxidation before they were melted down. Large stores, bound to accumulate under this policy, had the advantage of permitting the deliberate mixing of ores, alluded to in the preceding installment of this article. Such mixing, in turn, guaranteed the uniformity of the furnace charges. Chemical analyses had advanced to the point of making this procedure feasible. Thirdly, the furnace was now run systematically on the basis of scientific principles and practical experience, and its product was also subjected to chemical analysis.

Reputation was reflected in the number and size of the incoming orders, and after 1815 it seems to have been possible to drive the competing Bohemian iron from the markets to which the concern catered. Moreover the industrial revolution, then under way in Germany, led to an ever-increasing demand for iron and iron products. Thus soon after the Napoleonic War, orders came to outrun capacity, regard-

<sup>62</sup> Karl von Weber, "Detlev Graf von Einsiedel, Königlich Sächsischer Cabinets-Minister" in *Archiv für die Sächsische Geschichte*, I (1863), 187.

less of continuous expansion and improvements. In view of the customs situation, as it presented itself in 1818, the decision was made to build up the Gröditz plant which was to take care of the old Saxon cast-iron customers and the state's market in general. An extensive foundry was erected on filled-in swampland. It relied for the first years on the use of cupola furnaces that melted down scrap, as mentioned before. (These furnaces were an important eighteenth-century invention which made casting independent from blast furnaces.) In this connection Gröditz received a modern double-acting cylindrical blower of the English type, a better water supply, and a new water wheel. The improvement of the water supply was coupled with the digging of a barge canal which was to link Gröditz with an older canal connecting with the Elbe at Grödel. The building of the foundry started in September, 1818; in May, 1819, the new plant went into operation and still in the same year received an adequate storehouse for iron.

This, however, was only the beginning. In 1825, through the erection of a blast furnace, the Gröditz branch became an independent integrated enterprise, affiliated with the Lauchhammer Works. At the same time, the way was paved for the adoption of a promising new technology: the furnace was so constructed that coke could be used therein. Thus the plant was freed potentially from the hampering scarcity of charcoal, while it could also cut loose from the use of local bog ore. The furnace was to melt gangue ore to be mined in the areas of Moritzburg and Grossenhain north of Dresden and in that of Berggiesshübel near Pirna. This decision showed self-confidence and reliance in the ability to handle difficult technical problems, for the older iron industry based on the ores of Berggiesshübel had produced metal of a notoriously poor quality. As a matter of fact, after 1830 the Lauchhammer Works reopened the abandoned mines in this area, a remarkable achievement.<sup>63</sup>

By that time the Gröditz plant was acquiring a reputation for the production of pipes for water and gas works and of cast-iron products used as accessories. Gröditz thereby came to compete with the English iron works which had delivered all such equipment to the earliest German gas works erected by an English company after 1820. As early as 1827 Gröditz could book its first success in the field, and for

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<sup>63</sup> Regarding this place, see August Schumann, *Vollständiges Staats-Post- und Zeitungslexikon von Sachsen* (Zwickau, 1824), I, 313 ff.

many years thereafter it was the only pipe foundry of importance in central Germany. To be sure, for many years the crude iron produced in the Gröditz furnace was not good enough for those high-quality products, and that basic material was bought in England and Scotland and from German works in the Harz Mountains and the Nassau area.

We now return once more to the years 1816-1825. The spirit back of the actions and of the expansion of that era was in no way distinguishable from that dominant in the earlier period, and the Works' administration remained in the vanguard of the industry. But the problems to be solved were changing. To be sure, we hear again of improvements of the water supply (1814, 1818, 1819, 1822, 1824), but now for the first time we also learn that something was being done for the removal of the waste water (1816, 1824).

In the forges and finishing plants there were all sorts of improvements, and some of them were rebuilt or enlarged. Here are the dates: Burghammer: 1816, 1818, 1819; Lauchhammer: 1817, 1821, 1823; Grünwald: 1818; Mittelhammer: 1818, 1820, 1821; Spreewitz: 1819, 1821. But the emphasis of betterment was shifting. Stress was now being laid on erecting better storage facilities: Burghammer received a storehouse for coal; Lauchhammer: buildings for storing iron and limestone; Mittelhammer: a coal shack.

Turning to the furnaces, we learn that one of them was improved in 1821 by the installation of a steam engine so as to continue its operations during periods of draught or ice. The engine was produced by Wilhelm Holtzhausen (1768-1825) at the Royal Prussian forge at Gleiwitz, Upper Silesia, which had considerable engine production between 1794 and about 1825.<sup>64</sup> Moreover, the Burghammer furnace received a new building, blower, and lining; it was replaced by a new one in 1823.

In addition to such improvements, as remained essentially within the established patterns, attention was also directed to more fundamental technological progress and derivative innovation. In 1814, the Works built an implement, designed by the previously mentioned very reputable engineer, Brendel, for preparing the loam needed in the process of casting. In 1816, the enamel work received a plant for crushing quartz, several new furnaces, and a larger laboratory. But

<sup>64</sup> See my article in *Jour. Econ. Hist.*, IV (1944), 125.

that year was especially noteworthy for the erection of a cupola furnace in Lauchhammer. The attempt to operate it with charcoal was immediately successful, so that a second such furnace was installed in the following year. The importance of this innovation has been alluded to above. We may assume that thereafter objects were cast no longer directly from the furnace which from then on produced pig iron only. In 1817, the Lauchhammer plant was provided with a furnace to produce lime for building purposes and, in 1818, with a screw-cutting machine and a wood workshop. Other new lines were taken up when in 1820 the Lauchhammer plant was provided with two lathes for making large rollers, and when in 1821 the somewhat neglected Coyne plant received a rolling and slitting mill. The latter was ordered in 1819 in Upper Silesia from the forge master Abt who is not identifiable. It was not a modern rolling mill, however, since it did preparatory work only and left the finishing of the plates to the hammer.

Parallel with the improvements of the plants went improvements in office procedure. As early as 1797 the Works' correspondence was put on a mercantile basis, letterbooks were introduced and all incoming orders written into an order book whose pages were currently paginated. One may assume that by that time the Works' accounting procedure was of the type now called cameralistic, i.e., identical with that used by contemporary estates and territorial authorities. For the elder Count Einsiedel, a land owner and leading government official, such procedure would have been most natural.<sup>65</sup> In the late 1790's, when Trautscholdt entered the employment of the Lauchhammer Works, its management seems to have been planning a re-organization of the traditional accounting methods. Trautscholdt may have introduced mercantile double-entry bookkeeping by 1800; at any rate, in 1804 the first balance was struck and in this connection a capital account set up.

The Einsiedel, Jr.-Trautscholdt era experienced further noteworthy progress of office procedure. When in 1816 the first cupola furnace was erected, the capital cost, the cost of experimentation, and the current expenditures were put into a special account which was credited with

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<sup>65</sup> See Herbert Buhl, "Anfänge der kameralistischen Buchhaltung" in *Zeitschrift für Handelswissenschaft und Handelspraxis*, XXII (1929), 111 ff., 211 ff.; Ernst Walb, *Die Erfolgsrechnung privater und öffentlicher Betriebe: Eine Grundlegung* (Berlin, 1926), 208 ff.

the sales of such goods as were produced by the furnace. In the past the cost of establishing and putting into operation new plants or machines had never been kept separate, so that in 1816 for the first time it became possible to determine the profitability of innovations. The new method seems to have become accepted practice thereafter. Other changes in the accounting procedure reflected tighter control or led to better handling of raw materials. Prior to 1809 and 1814, respectively, a certain percentage of ore and coal was written off automatically; from 1816 on, this practice was abandoned.

TO BE CONTINUED

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## AN ENGLISH MERCHANT HOUSE IN CHINA AFTER 1842

... An untried business, entered into by many recklessly and ignorantly, and sure therefore to be overdone at first, ending in heavy losses, taking time to weed out the unknowing and imprudent. . . .

WILLIAM RATHONE, V<sup>1</sup>

### I

A good deal has been written about general commerce between Britain and China in the mid-nineteenth century.<sup>2</sup> But little is available to illuminate the problems of trading as they confronted particular persons or commercial Houses. The surviving records of Rathbone, Worthington and Co. make possible a study of the question: what sort of calculation did rational men attempt in order to turn to profit these new and inchoate markets?<sup>3</sup>

In the early forties of the last century, China offered a dramatic challenge to young English merchants. The East India Company's monopoly in trading to the Celestial Empire ended in 1833; the Cohong, the corresponding monopoly on the Chinese side was destroyed by the Treaty of Nanking in 1842. To the great concern of the Chinese authorities the merchants of the west were at liberty to impact upon their economy. A group of young men in the north of

<sup>1</sup> William Rathbone, V., to S. G. Rathbone at Canton, Jan., 1845.

<sup>2</sup> See A. J. Sargent, *Anglo-Chinese Commerce and Diplomacy* (Oxford, 1907); H. B. Morse, *The International Relations of the Chinese Empire, The Period of Conflict, 1834-1860* (London, 1910); H. B. Morse, *The Trade and Administration of the Chinese Empire* (London, 1908); S. F. Wright, *Hart and the Chinese Customs* (Belfast, 1950).

<sup>3</sup> The chief manuscript sources are the Rathbone Family Papers and the Rathbone Business Papers, hereafter designated R. F. P. and R. B. P. Generous facilities for studying the former were made available by Mrs. Evelyn Rathbone, to whom I am greatly indebted. The latter valuable collection has been deposited on loan with the Department of Economics, The University of Liverpool, by the firm of Rathbone Brothers. The records of Rathbone, Worthington and Co. extend beyond the period treated here, but the present intention is to deal with the first decade of the trade. I should also like to thank Mr. J. Murphy, of the Department of Education, Liverpool University, who drew my attention to the above sources.

England, all former schoolfellows, responded at once; William and Samuel Rathbone of Liverpool, and Thomas Ashton,<sup>4</sup> James Worthington,<sup>5</sup> and James Birley of Manchester, almost simultaneously embarked upon the new markets. Thomas Ashton sought connections for his flourishing Manchester House, largely through his young friends; James Birley set up his own business in Canton; and the two Rathbones, under their father's aegis, joined with James Worthington in carrying the Rathbone name to Canton and Shanghai.<sup>6</sup>

The new trade was very different from that to be expected from an apprenticeship in an established House in Liverpool or Manchester. It was conducted in a setting more alien than any other, where the rulers of a proud but decaying empire granted sufferance only after they had been coerced. Its commercial institutions for foreign dealings were in merest embryo. Trade in its legitimate commodities was highly volatile: tea, silk, Indian cotton; its great staple, opium, was both baleful and illegal; smuggling was universally practiced with ludicrous ease. Inevitably abuses became cumulative, for what House could long forego the large profits which seemed to accrue so readily to easy commercial virtue?

The new young men from Liverpool and Manchester had been raised in the strictest liberal, unitarian tradition. For them it was a commonplace that foreigners were worthy of respect, that laws should be obeyed, that business succeeded best with hard work and the conscientious discharge of bargains, that nothing whatever could excuse the debauching of others. Their rivals were those who had by subterfuge traded in China even under the East India Company, those who had come after 1833 and urged on the breakdown of the Cohong, and those who, though also newly arrived, were encumbered with less scruple.

## II

Well before the Treaty of 1842, Rathbone Brothers, for two generations a leading firm in the American trade, had been pondering what China might hold. They had many connections among the merchants

<sup>4</sup> For biographical details, see a brochure published by Ashton Brothers and Company Limited.

<sup>5</sup> Obituary, *Manchester Guardian*, Aug. 22, 1887. Worthington was a favourite protégé of the first Thomas Ashton.

<sup>6</sup> They were joined in 1850 by W. S. Brown.

of Boston and Salem, who as long ago as 1784 were driving a thriving trade with the East Indies and China, and supplying much of northern Europe with teas, spices, silks, sugar and coffee from the East.<sup>7</sup> William Rathbone, V, as the agent of the East India Company in Liverpool, already knew something of India and China. It appeared to him and Powell his partner that the new China trade might be a useful complement to the old American dealings. The young William fully concurred. He had concluded that the American trade was likely to be unstable for some time, and informed his father: "We must have some other business in which to employ our funds when we do not think it advisable to do anything with the United States." In this sense the Rathbones were attracted to China for reasons different from those affecting most East India Houses created after 1833; the former saw China as a complement to America, and the latter saw it rather as completing the new trading area partially opened with access to India in 1813. In fact under the severe buffettings that the American business suffered in the mid-forties, William, Jr., went so far as to say: "We are really becoming rather tired of the trade and if we can only make anything of the East I think our affections will gradually turn thitherward."<sup>8</sup>

John Bates, who had extensive Eastern as well as American connections was consulted in 1841, replying that "with regard to the China business, it will be time enough to talk of it when the trade has been open for two or three years."<sup>9</sup> He advised against participating in the hazards of the period immediately after the Treaty; Rathbone Brothers concurred, and in the interim William set off for a tour of America, charged with contacting those who knew the trade to Canton, including the important Russell and Company, or those who might be prepared to do business with a new English House in China.

On William's return to England in 1842 preparations for the China venture began in earnest. The partnership was formed, embracing James Worthington, William Rathbone, Jr., and Samuel Rathbone, ages twenty-five, twenty-three, and twenty-one, respectively. The

<sup>7</sup> See K. S. Latourette, *The History of Early Relations between The United States and China, 1784-1844*. (Transactions of the Connecticut Academy of Arts and Sciences, XXII, Aug., 1917.)

<sup>8</sup> William Rathbone, Jr., Liverpool, to S. G. Rathbone, Canton (R. F. P.), Nov. 3, 1844.

<sup>9</sup> John Bates to William Rathbone, Sr. (R. F. P.), Mar. 12, 1841.

elder William was also interested, but left the concern almost wholly to his juniors, confining himself to general advice. It was a young man's game, wrote Sam later from Canton, requiring men "age from twenty five to thirty five, past wildness, but not arrived at infirmity."<sup>10</sup>

Late in 1843 Worthington and Sam Rathbone departed for the East, the former by an overland route, the latter via Boston accompanied by a case full of improving literature including the sermons of Channing, Dewey and Butler, and Herschel's "Discourse on Natural Philosophy."<sup>11</sup> Sam was to obtain while in America samples of each kind of cloth sent to China, along with a report on the respective quantities sent for some years back. At home optimism about China was mounting; William reported with some enthusiasm after a drumming tour of Birmingham and the Midlands that he had persuaded Strutts of Derby to try the China market, and that "Rabone Brothers say they understand the markets and *talk* of 40% profit."<sup>12</sup>

Sam and Worthington were reunited just in time to welcome the first consignments to the House, at a moment when the Canton market had collapsed in the recession of 1844. The goods consisted of a heterogeneous cargo that William and Worthington had picked up in England with only the most general sense of the markets—cotton goods, needles, buttons, American cloth, and £300 worth of "jewellery." The young partners chartered a fast sailing clipper to carry their goods up to Shanghai, consigned to the House of Russell and Company, with Sam accompanying them. Russells were kind enough, but told Sam he was on his own in disposing of his cargo. After an almost sleepless forty-eight hours, he concluded an arrangement with a Chinese merchant, one Alum, one of the very few still prepared to buy. The upshot was a loss much less than that expected. But they had suffered their first experience of the hazards of the new trade.<sup>13</sup>

<sup>10</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Jan. 10, 1850.

<sup>11</sup> Letter from his mother (R. F. P.), Oct. 15, 1843. Mrs. Rathbone in her letters continually reminded her son, with tact and sincerity, of the possible effects upon character of trading in China.

<sup>12</sup> William Rathbone, Jr., Liverpool, to S. G. Rathbone, Boston (R. F. P.), Nov. 4, 1843.

<sup>13</sup> An account of this incident is contained in a Memorandum by William Rathbone (R. F. P.).

This disturbing incident concluded, they settled down to adjust themselves to the new setting and to spy out its opportunities.

The young men soon discovered the outlines of their commercial problem. They had first in a general sense to learn the peculiarities of Chinese commerce, and select those markets in which they proposed to deal. This meant a study of the behaviour of a particular range of prices, for the most part highly volatile. But a purchase or sale was not complete in itself; there was the question of the value of the currency bought or sold—the exchange market. Further, transactions both in goods and currencies were conducted under peculiar stresses of time. What range of transactions of both sorts, within what limits, would meet this complex situation?

### III

The markets for real goods, of course, were of two types: those which offered opportunity to sell in China, and those involving purchases there. The first was largely a question of disposing of the manifold products of British manufacture along with Indian raw cotton; the second of buying, in the main, raw silk and tea. There were two problems which attached to both: how to keep customers informed through a system of advices, and what balance to strike between acting as a commission agent, and undertaking speculation on account of the firm itself.

The House at first took Canton as its headquarters and the centre of its trade. There Sam and Worthington, with a single room for office, dining and living space, began operations. By trial and error and perpetual watchfulness they began to grasp the nature and intricacies of Chinese dealings. With the dissolution of the official Cohong, it was not easy to find reliable sources of information. Sam soon discovered that "the only natives in whose opinions any reliance can be placed are the leading merchants."<sup>14</sup> But this of course left out of account the myriad of lesser traffickers whose activities were of great importance, and the Parsees with their active cotton and opium trades and their greater adeptness at Eastern bargaining methods.

Selling in China of course meant discovering within the Chinese

<sup>14</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.) May 27, 1845. For the general disappointment in exporting western goods to China in the forties and fifties see Sargent, *op. cit.*, p. 133.

consumption pattern hitherto unexplored desires capable of responding to the manufactured novelties and factory processed fabrics of the West. This meant altering the traditional culture of the Empire—the very thing that had rendered the Chinese so hostile to the newcomers. Even the reputable Chinese merchants, who were at least partially reconciled to the commercial incursions of their customers, were of little help when it came to experimentation in new articles. They would "not condescend to give any information about peddling things," and if their opinion was that a proposed novelty would not pay, it was conveyed in the remark "more better no bring here." All further questions were regarded as idle and they would "reply to them at random."

With the spokesmen of Chinese consumers so unenterprising, there were two remaining alternatives: to attempt to penetrate Chinese tastes by more direct inquiry, or to abandon the effort to develop new lines altogether. Sam did his best with the first line of attack, but it proved expensive: "All shipments sent on trial lose money we believe almost without exception."<sup>15</sup> Even if the articles could find buyers, the Chinese merchants would not at first pay the full value, shifting the whole cost of developing new tastes onto the foreigners. Expensive fabrics were no good, coming into competition with the native silks. Dyed linens too, were almost impossible, for the Chinese dyeing techniques were far superior to the English in fastness and beauty of shade. Chintz and flannels were very liable to oversupply.

William, in Liverpool, as became an eager student of Tooke's "*Prices*" and M'Culloch's "*Commercial Dictionary*," did his best to help by studying such official statistics as were available. He discovered that the East India Company had enjoyed a thriving trade in woollens to Canton in the old days, and that the Russians were still able to dispose of large quantities. But this information was curtly dismissed by the man on the spot. The East India Company had succeeded in this, said Sam, by bringing the full power of its monopoly into play, and "as for the Russian trade and the statistics of it, it may be all very well in theory, but for practical guidance they are not worth a fig," because it rested on a system of bounties and monopolies. "I am quite surprised," wrote Sam, that "people in England should look upon [such] statistics as a guide in judging as to what it is

<sup>15</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Aug. 22, 1845.

expedient to ship under a free trade system."<sup>16</sup> It was perhaps to be expected that an occasional note of acerbity should arise between the partners in China and England.

Buying in China meant, in the main, dealing in produce markets surrounded by conditions peculiar to themselves, with a view to selling months in the future, on the other side of the world. Samuel Rathbone and James Worthington, if they were to take any cognizance of the information forwarded from England as to the state of the markets there as a guide to buying, would find that there was a gap of six to eight months between the gathering of information for the formation of opinion, and the laying down of new purchases in the markets concerned.

Each of the great staple articles had its peculiarities and problems. Perhaps the least difficult was silk. It was attended with the usual annoyances of Chinese commerce, required a staff of highly skilled inspectors, and like everything else, suffered from a different understanding as between London and China of the terms by which different qualities were designated. Further, silk purchases involved "the additional cost of placing funds up at the North."<sup>17</sup> But it had the great advantage of following a fairly steady price pattern over the season. At the opening in June or July it always began low, rose during the first month, but thereafter hardly varied more than some 5 per cent. No doubt this was in part due to the smallness of the foreign trade relative to home consumption.

Raw cotton was a great deal more troublesome. It was imported from India for sale in China. As consignees in Canton, Rathbone, Worthington and Co. had to stand between the Parsee merchants of Bombay, who always overestimated the returns due to them, and the Chinese merchants of Canton, adept at imposing deductions and charges.<sup>18</sup> The Parsees, with their custom of holding back, then rushing to sell in a rising market, involved everyone in a welter of tumbling prices. Worthington reported home that "the cotton business even when not very large entails immense trouble and correspondence, besides sometimes occupying a partner almost completely at

<sup>16</sup> *Ibid.*, June 9, 1845.

<sup>17</sup> William Rathbone, Jr., Liverpool, to S. G. Rathbone, Canton (R. F. P.), Mar. 7, 1846.

<sup>18</sup> Rathbone, Worthington and Co., Canton, to Roopjee Rowjee, Esq., Bombay (R. B. P.), Nov. 17, 1848. There was no cotton sold in Shanghai.

mail time in arranging the various remittances whether in gold, silver, or Bills on England or India."<sup>19</sup> But there were also Parsees at the Canton end of the trade. Formerly, as Worthington observed, selling cotton was a matter of dealing with a respectable Hong, but now English traders must "compete with the Parsees who will frequently spend a whole day haggling with a Broker over a single mace." Most of the cotton shipments from Bombay to Canton were consigned to Parsees, who, as Samuel reported, "charge a still lower commission than we do."

But tea was the most difficult of all commodities; it was agreed by the English merchants to be, of all others, a "sporting trade." Grading was enormously difficult, involving the merchant in great dependence upon his tasters, who were likely to suffer from "the passion most tasters have for buying tea for the mere love of doing so."<sup>20</sup> Canton and Shanghai were separate tea markets and because of imperfect communications could produce very difficult conditions. The two markets could be active at the same time, both bidding prices up, with the result that, as Brown wrote, "the excess takes place before either Port is aware of the extent of the trade in the other."<sup>21</sup> The Chinese had surrounded their dealings with a more than usually difficult set of customs. They helped to produce unpredictable market phenomena; as Sam explained, they "have so often kept quantities of tea out of sight."<sup>22</sup> It was a favourite technique to sell two different grades in a single transaction, of widely differing suitability to the markets envisaged. Yet separation of the purchase was impossible; as Sam sadly remarked, "it is astonishing how tenaciously the Chinese adhere to this mode of business."<sup>23</sup> They were equally impervious to market reports from England. If a fall in the English price was advised, "the Chinese only partly believe . . . and it is only when they

<sup>19</sup> J. Worthington, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), June 5, 1849.

<sup>20</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Dec. 10, 1849.

<sup>21</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Apr. 8, 1851. "I don't wonder," wrote Brown, "at some people wishing the old monopoly of Canton back again; it must have been a safe and simple trade then compared with what it has been since 1843."

<sup>22</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Dec. 22, 1849.

<sup>23</sup> *Ibid.*, May 27, 1845.

find that they cannot sell any tea for some months that they come down in force or perhaps convert that particular description into some other kind. . . ." <sup>24</sup> Then there was the problem of reactions to prices in England. "The consumption at home often seems longer on a tea after it has reached a high relative price than one would anticipate," wrote Sam in a special letter devoted to the mechanics of the trade, "and a low price of a particular description is on the other hand often longer in attracting attention to a tea than one would expect." As Sam pointed out, all these things were very difficult to embody in a judgement; operations "founded on deep calculations" often turn out badly, "while those on weaker grounds result well." "One thing is certain," he wrote, "a man may be too clever for China." <sup>25</sup>

But in spite of these difficulties of the produce markets, it was in general easier to sell Chinese produce in England and elsewhere, than to sell manufactures in China. The great equalizer employed by most firms (more profitable than bullion shipments) was opium. Its purchase in India and sale in China was the only apparent way, in the short run, to make things balance, without a continuous and expensive drain on the world supply of silver. But opium involved difficulties of morality, which for Messrs. Rathbone, Worthington and Co. were insurmountable.

Both in acting as a Commission Agent, and in dealing on its own account, the House needed an effective system of advices both ways between China and England. In acting for others the problem was very thorny, for orders would flow largely on the basis of the opinions put out by Rathbone, Worthington and Co., and the parent house, Rathbone Brothers, in Liverpool. A transaction involving a loss was bound to cause recrimination and charges of wrong information. Much of the judgement of markets was, as Samuel explained, a matter of "feeling or rather vague impression," which might overbear in the minds of Commission Agents the ostensible facts which must appear in advices and circulars. Frequently goods were consigned to Rathbone, Worthington as Agents, with discretionary instructions to sell when it seemed to them best. There were often charges by consignees that "after holding over goods so long you sell them just at a time when there are five hundred reasons for expecting an advance which would

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<sup>24</sup> *Ibid.*, Jan. 11, 1850.

<sup>25</sup> *Ibid.*

have repaid our outlay."<sup>26</sup> Then there was the question of the distribution of emphasis in advices; on one occasion floods in the interior had been "casually mentioned" to customers, without sufficient emphasis upon what they would mean to the Chinese economy. Then too, in dangerous times especially, connections in England and America would expect information about the standing of China Houses, a difficult business indeed.

Because tea was the most volatile of commodities, it presented this problem in its most aggravated form. Sam very early felt the disadvantage of having the House centred in Liverpool, rather than in London, the great tea market. He himself wrote Rathbone Brothers' tea advices, and ruefully described them as "sadly too little instructive."<sup>27</sup> They gave so little information that their customers could not form an independent opinion of their own. The upshot was that such Houses, unable to judge for themselves, seized avidly on any guidance contained in the advices, imposing a great strain indeed upon the author. Thus ignorance generated, in a cumulative way, decisions which might be very right or very wrong.

But the most difficult questions associated with a system of advices were even more deep-rooted than the problems, great as they were, of gathering information. They arose from the fact that such a system suffered from an irresolvable dilemma. The more effective an advice was in prompting action, the more likely it was to falsify itself. Simple faith in such a system was an example of the failure to appreciate the fallacy of composition: that an act profitable to a single individual will not be profitable if adopted by all. Thus to designate convincingly a given quality of tea as a good investment will immediately make it cease to be so. To act rationally upon such advices then is not to act literally, but to attempt three difficult estimates concerning their effect upon others: their potency in provoking action, its direction, and its timing.

Finally, there was the question of the extent to which the House should speculate on its own account as opposed to commission transactions. William tended to emphasize the latter, and to fear damage to the commission business in America and elsewhere if they acted as principals. To Sam his brother seemed "needlessly alarmed." It was his impression "that at least three fourths of the money made in China

<sup>26</sup> *Ibid.*, Dec. 22, 1849.

<sup>27</sup> *Ibid.*, Dec. 11, 1849.

for the last ten years has been made in the English trade by business on own account."<sup>28</sup> Brown, too, was in favour of so acting. He compared China with India in this regard. Expenses in China were "heavy beyond all Indian experience." Success in commission business was "more problematical in China than in either Calcutta or Bombay," but the merchant undertaking his own dealings could do better in China.<sup>29</sup> Sam further argued that such dealings on their own account would greatly improve their circulars, by broadening their experience.

All these decisions had to be taken under great stresses of time. Business varied from the most intense activity to almost total idleness. There was first the fact that dealings in Chinese markets were bunched seasonally, beginning in June and ending in December, coinciding with the flow of fine Congou Teas from the interior. In June there would be a great concourse of shipping in Chinese ports containing the cargoes prepared in Britain and America during the off season.<sup>30</sup> Then there was the bunching of arrivals between June and December; unfavourable winds could mean that even in the season everyone might be loafing about waiting for the mail. These factors meant an involved and erratic tempo. The appearance of tea in June would start the bidding in the markets concerned, in a careful, tentative, way. But sales of imported manufactures would begin vigorously, under the influence of the American practice of sale on arrival. As the various produce markets established their outlines they would gradually rise to a crescendo of activity. Particular groups would aggravate matters, like the Parsees with their tendency to "sell their produce in a flock." Exchange dealings would go on throughout the season, but would tend to rise to a peak toward the close, as westerners, usually anxious not to have idle funds in China, sought to move them elsewhere. And it was just at such hectic times that the English sea captains had to be dealt with, who in Sam's opinion were "such stupid uneducated brutes that nothing one can do gives them satisfaction."<sup>31</sup>

<sup>28</sup> *Ibid.*, Apr. 18, 1850.

<sup>29</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), July 16, 1851.

<sup>30</sup> For the routes followed by American ships see Latourette, *op. cit.*, p. 145. For British ships, see C. Northcote Parkinson, *The Trade Winds* (London, 1948), p. 152.

<sup>31</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Jan. 10, 1850.

It was little wonder that the books got behind, a chronic condition for all English Houses in China. By 1850 Rathbone, Worthington and Co. were two years in arrears with their General Ledger, and there were no entries at all in the Private Ledger subsequent to June, 1846. But though the books were in such condition that it was no longer possible to discover on what principles they had been intended to operate, the firm was no worse off in this respect than Jardine, Matheson and Co., Lindsay and Co., or Halliday and Co. Under these stresses correspondence was almost as difficult. "Few Eastern Houses keep up to the mark in their correspondence," said Sam. Had communication been as good as the actual management of business, he wrote, "we should have been a larger House at the present time."<sup>32</sup> Complete lucidity, always so difficult, was called for in order to avoid misunderstandings in England: "The China mail arrives in company with so many letters from India, Egypt and the Levant, that letters by it are hastily read." All this meant that the China partners were in danger of bogging down in the mechanics of the job. But Sam was aware of the danger: "If a business is to be *pushed*," he wrote, "a partner's thoughts must be free to ponder over matters."<sup>33</sup>

These, then, were the trading problems to be faced. On the side of imports into China, what selection of goods should be made, and what rules for their handling did experience indicate? From the point of view of exports of produce from China, what general attitudes should be adopted toward the main components, cotton, silk, and tea? How was the problem of advices to be treated, and to what extent was the firm to act as agent or principal?

#### IV

Both Samuel Rathbone and W. S. Brown (who joined the firm in 1850) were unhappy about attempting to deal in such markets on the basis of mere improvisation; both felt that the House should attempt to guide itself by some choice of principles. Moreover they believed that these could be fairly readily arrived at. Brown wrote to William Rathbone: "Observation and experience have . . . led me to believe that a greater part of Eastern business follows a general law."<sup>34</sup> The

<sup>32</sup> *Ibid.*

<sup>33</sup> S. G. Rathbone, Canton, to Thomas Moncrieff, Shanghai (R. B. P.), Jan. 1, 1850.

<sup>34</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Oct. 27, 1851.

merchant who is without these "general guides of action" will be "apt to be blown about by every wind of doctrine, and his proceedings merely be a series of expedients for the day."<sup>35</sup>

Business methods should be adjusted to make this possible. The books, so disastrously in arrears, were to be kept so as to reflect the general results of business policy: "it is more important to have the books in China simple than very exact."<sup>36</sup> Correspondence should have its own philosophy: "when you have proved right bring it neatly wrapped up before the notice of your constituents, if wrong explain how events not to be foreseen" are responsible, unless a real mistake has been made, which should be freely admitted to customers, for "then the straightforwardness of it takes them."<sup>37</sup>

First, as to selling in China. It soon became clear to the partners there that little was to be hoped from the attempt to interest the Chinese in a variety of new and untried things. Here appeared a difference of view between Sam and William that was to persist throughout their trading lives. Sam told his brother so in express terms: "I really think," he wrote, "you are too apt to neglect the articles which we understand and turn too much of your attention to new and untried paths to profits."<sup>38</sup> For Sam, as early as the forties, the concept of the merchant as carrying a great heterogeneous assortment of goods, in order to be continuously feeling for changes in tastes, was archaic; as he put it, China did not offer "a trade for peddlers." Instead the firm must look to a few leading lines, "the Markets for which we observe closely." Accordingly he wrote home: "we have therefore to request you will protect us as much as lies in your power, from inquiries about new or minor imports, except where these will direct us at a future period to the great staple articles."<sup>39</sup>

Their worries thus reduced, the partners could study the behaviour of these staples. There was for example the relationship between

<sup>35</sup> There was also the risk, as Sam put it, "of a partner turning out clever"; that is, backing speculative guesses. S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Dec. 10, 1849.

<sup>36</sup> *Ibid.*, Jan. 10, 1850.

<sup>37</sup> S. G. Rathbone, Canton, to Thomas Moncrieff, Shanghai (R. B. P.), Jan. 1, 1850.

<sup>38</sup> S. G. Rathbone, Liverpool, to William Rathbone, Jr., U. S. A. (R. F. P.), Jan. 25, 1849.

<sup>39</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), May 27, 1845.

fluctuations in the cotton piece goods market in Manchester, and in the China Trade. It was discovered that after a break in prices in Manchester, large profits were earned by those who could first lay down goods in China.<sup>40</sup> But the harvest time was short, ending in losses in China because of the faulty timing calculations of the dealers and the failure of each to appreciate that many would act together. These interval profits were possible because the Chinese, with their indifference or scepticism of Western market reports, were not able to anticipate and wait for the full sag in prices. Then, too, it soon appeared that there was a relationship between the success of the perennial war against the coastal pirates and the demand of their victims, the junk operators, for shirtings.<sup>41</sup> The coastal trade as far as Singapore varied as the number of active participants changed, according to the wish of speculators to employ idle funds, or shippers to find freights for vessels which they did not wish to load home until later.

But a rule of more general application was arrived at. Once the House was so committed that goods were on the way to it in China, it was the best policy, in general, to sell as soon after arrival as possible, taking the markets as they stood without refined reasoning about further reactions. This was the practice of American Houses. They made their calculations and commitments in April and May in Boston and elsewhere "when the China voyages were getting up," ostensibly taking the market data then available as their guide. They sold on arrival, which meant of course, that so far as the time element was concerned, the scope for change was minimized. "One can seldom foresee the future course of Markets far ahead in China," wrote Sam, "and it seldom answers to hold for distant prospects of improvement."<sup>42</sup>

In buying and selling primary produce it was necessary to attach some general policy rule to each of the three main elements, cotton, silk, and tea. Cotton was troublesome on its own account; moreover, it involved the vexed question of trading in opium. Both came from India, and as Worthington remarked, "there is no denying that with-

<sup>40</sup> W. S. Brown, Shanghai, to William Rathbone, Jr., Liverpool (R. B. P.), Oct. 11, 1851.

<sup>41</sup> Rathbone, Worthington and Co., Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Dec. 3, 1849.

<sup>42</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Jan. 11, 1850.

out the opium, the cotton business alone is certainly not worth having."<sup>43</sup> The upshot was a decision to undertake cotton shipments only when they could be justified on other grounds, chiefly the convenience of customers. This made it easier to shift the headquarters of the House from Canton, with its reliance upon the Indian connection, to Shanghai where the tea and silk markets were rapidly growing.

Silk, however, was something to develop. Brown enunciated the rule that because of the typical trend of prices year after year, most purchases should be bravely made at the opening of the season.<sup>44</sup> Further, because of its price steadiness after the initial rise, Houses in England could send much more definite instructions to agents in China, for then the major variables were on the demand side, which could be best judged on the spot in England. Finally, because of the predictability of its price movements, silk was the best available article in which to hold funds in China, should it be judged wise to keep assets there rather than in England.

From the point of view of wholesale buyers of silk in England, the problem of policy was approached in a rather different light. Durand and Co. in fact constructed a demand schedule, expressing the prices they were willing to pay for silk (and indirectly what they thought English consumers would pay) as a function of the volume of imports.<sup>45</sup> Thus, with probable imports

5,000	Bales, bid at	17/- to 20/-
10,000	" " "	15/- to 18/-
12,000	" " "	14/- to 17/-
16,000	" " "	12/- to 16/-
20,000	" " "	11/- to 15/-
22,000	" " "	10/- to 14/-

But tea, the most difficult commodity, stood in greatest need of rules of guidance. "The home market is so distant and there are so many elements of uncertainty in China," wrote Sam, "that we are convinced general principles are a better guide here than elsewhere."<sup>46</sup>

<sup>43</sup> J. Worthington, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), June 5, 1849.

<sup>44</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Oct. 27, 1851.

<sup>45</sup> Rathbone, Worthington and Co., Shanghai, to Rathbone, Worthington and Co., Canton (R. B. P.), Dec. 3, 1849.

<sup>46</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Apr. 22, 1850.

Tea tasters should be trained both in English and American tastes, and avoid the error of taking too little notice of what is offered when the House was not actually buying. Failure to do so had involved delay when a decision was made to enter the market. The House should strive for a strong connection in London, the centre of tea dealings. Yet on the whole, purchasing was to be left to the partners on the spot in China, "as unfettered as possible by instructions." But the House was to avoid accepting discretionary orders from others, whose trust would not be so implicit. Most important of all, refined calculations were more deceptive than useful; it was better to ignore complexities and to adopt "the general rule of only shipping when teas are cheap and then shipping freely." "Cheapness is the great thing," wrote Sam, and long-run profits would accrue, "if teas are avoided when high, and only shipped when low, adhering principally to the kinds in staple current demand."<sup>47</sup>

The market strategy of the House being thus determined, there was the problem of advices—what sort of information should they provide? Here a China House could not opt out. The question would certainly be less acute for a firm speculating on its own account, but even then it would desire to inform dealers in the United Kingdom. But with so much done on a commission basis the problem was serious. The solution was to have two sorts of advices—one for public consumption, and one for circulation within the firm.

The first should consist of fact only, leaving to the customer the question of interpretation. As William put it, after one of the not infrequent misunderstandings on this score, "if you have only stated the fact fairly and distinctly, it surely is for the party whose interest it is, to decide what should be his course." This rule he had derived from his father. But there remained the question of the selection and presentation of the facts; the author of an advice could hardly be "neutral." William described the real alternatives succinctly: either "to give decided opinions and the grounds of them," (Sam's preference) or "to place the facts so as to lead parties to the opinions you hold."<sup>48</sup> Of course this problem assumed its most acute form when the question at issue was not the market trend of a commodity, but

<sup>47</sup> *Ibid.*, Jan. 11, 1850.

<sup>48</sup> William Rathbone, Jr., Liverpool, to S. G. Rathbone, Canton (R. F. P.) Aug. 4, 1844.

the credit worthiness of a firm. These were most needed in difficult times, but it was just at such junctures that their hazards were greatest, and they were accordingly most rigorously curtailed.<sup>49</sup>

Even advices between members of the same House or group of Houses were not free of difficulty. Sam accused William of being "too apt to regard what were meant merely as suggestions as definite instructions."<sup>50</sup> For example, when Sam expressed the opinion from Canton that woollen blankets would pay in China, he did not expect William simply to ship them, but only to do so after full enquiry as to what other English merchants proposed in the matter of blankets.<sup>51</sup> But he did not explicitly say so. Thus there was always the problem of knowing the full range of assumptions for every statement, in order to make sure that the final decision-taker in England or China was in fact making a judgement based on pieces of information the relationships of which were correctly understood. Then there was the danger of the parent firm and the China House moving in a circle—an opinion emanating from Canton, being incorporated in the circulars and advices of Rathbone Brothers and reappearing in Canton garbed in different words which might well seem to connote an instruction.

Rathbone, Worthington and Co. were, however, not merely writers of advices and circulars, but also readers of those of others. What canons of interpretation should be applied here? On this matter the elder Rathbone, after consulting his American friends experienced in China, gave his view.<sup>52</sup> It fell into two parts. Take such circulars not as in themselves constituting a literal guide, but as merely one more datum. Secondly, rely on objective information rather than opinion. On the first score he pointed out the time lags involved in such information, but much more important, he knew that such advices, more especially if reputable, would themselves alter the markets. Thus, taking tea as an example, the advices might be "such as to make a *run* on green tea, when perhaps taking a prospective view . . . to purchase black would be preferable, and to be bought on the most

<sup>49</sup> W. S. Brown, Shanghai, to William Rathbone, Jr., Liverpool (R. B. P.), Oct. 11, 1851.

<sup>50</sup> S. G. Rathbone, Liverpool, to William Rathbone, Jr., U. S. A. (R. F. P.), Jan. 25, 1849.

<sup>51</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Aug. 22, 1845.

<sup>52</sup> W. Rathbone, Sr., Liverpool, to S. G. Rathbone, Boston (R. F. P.), Oct. 12, 1843.

favourable terms because neglected." A trader must take into account the impact upon the minds of all other traders of the sources of information common to all, and act accordingly. But the safest rule was "to be guided by general calculations on stocks, consumption, etc." As we have seen, Sam thought even this too complex, and proposed the simple practice of buying only in a depressed market.

The rules thus arrived at, of trading, and of sending and acquiring information, affected the argument as to the division between commission business and speculating for the House. In general the rules were such as to inhibit acting for others. The opting out of cotton, the confining of tea dealings to a sagging market, the cautious form of advices all militated against commission business. Silk in fact was almost the only field for effective dealings of this kind. It was natural that Sam and Brown, whose studies of the markets had yielded these conclusions, should wish to back their judgements, rather than deal exclusively as mere intermediaries. Accordingly we find the firm in spite of William's misgivings, embarking on fairly large operations on its own account.<sup>53</sup>

## V

No less important than dealing in goods was the problem of converting the proceeds to the best advantage into the various currencies involved in the China trade.<sup>54</sup> From the exchange point of view the problem of the English merchant in Canton or Shanghai can be readily generalized. In order to buy Chinese goods, how might funds be most cheaply laid down in Canton or Shanghai in a form generally acceptable there? To remit the proceeds of such sales to England for the purpose of further transactions, how might Chinese funds be most

<sup>53</sup> Of course the rates charged by Commission Houses were not independent of the rates of profit enjoyed by traders. In 1850 there was a scheme afoot among the American commission men in Canton to raise their charges by joint agreement about 50%. The principals at home threatened to send out their own representatives if the Commission Houses persisted. James Worthington, New York, to William Rathbone, Jr. (R. B. P.), May 7, 1850.

<sup>54</sup> I am indebted to Mr. H. W. Meyrick and Mr. J. Leighton-Boyce of the Chartered Bank of India, Australia, and China, for valuable suggestions on this aspect. For the general banking and monetary background, see A. S. J. Baster, "The Origins of the British Exchange Banks in China," *Economic History*, III (Jan., 1934), 140; C. N. Cooke, *The Rise, Progress and Present Condition of Banking in India* (Calcutta, 1863); W. F. Spalding, *Eastern Exchange, Currency and Finance* (London, 1917).

cheaply laid down in London or Liverpool? The idiom of the Exchanges was a fundamental element of their thinking. From England to China, or vice versa, remittances could be made in a money or credit instrument evaluated by the exchanges, or they could be made in goods. As Samuel Rathbone put it, "the question simply being whether British manufactures are likely to prove a cheaper means of placing funds in China than the sale of Bills on London under credits."<sup>55</sup> The criterion for buying real goods in China for England or vice versa, was always whether a given shipment would "give the Exchange of the day"; if not it was not undertaken, and the remittance was made in bills or other instruments. Thus the exchanges and the produce markets tended to be regarded as quasi-independent phenomena, constituting alternative lines of action, a point of considerable importance to which we shall recur later.

In practice, there were four principal methods of remittance in or out of Canton and Shanghai; the sending of goods, movements of specie, traffic in private bills, and dealings in the East India Company's Bills.

Transactions in goods of course depended upon calculations of buying and selling prices, loaded with costs of shipment. A movement of goods took place when the expected net revenue from the sale at the point of final delivery exceeded the cost of the purchase by a margin greater than the profit available from exchange operations over the period of the transaction. If it did not, then attention turned to the alternative instruments of remittance.

The volume of bullion and specie was a minor part of the total of money or money instruments in the markets of the ports at any given moment. But from time to time the cheapest way to lay down the dollar was by such imports. Silver bullion ("Sycee," the uncoined shoe-shaped ingots of pure silver) had always been a vital element in the "Country Trade" between India and China,<sup>56</sup> and was moved about a good deal by the Parsee merchants. But the most important specie in China, constituting the currency of the ports, and in which most English merchants kept their accounts, was the Spanish silver dollar. This coin, the Carolus (or Pillar) dollar of the reign of Charles IV (1788-1808) was the only one in which the people of mid-China

<sup>55</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Apr. 26, 1845.

<sup>56</sup> See Michael Greenberg, *British Trade and the Opening of China, 1800-1842* (Cambridge, 1951), pp. 49, 159, 199.

had any confidence. But it also enjoyed world-wide acceptability, causing it to move freely between trading economies not capable of maintaining their own currency: the West Indies, South America, West Africa, China, and so on, constituting itself the great unit and medium of arbitrage. It was the universality of this Carolus dollar that provided the unifying element between the price levels of such countries as China and the rest of the world.

From time to time such shipments had taken on a dramatic character. Movements in or out of China could be very great if the balance of trade warranted them. Prior to the development of opium consumption in China, the failure to persuade the Chinese to buy goods available to European merchants had meant a heavy drain of silver to the East. From the point of view of the individual merchant this problem presented itself in the form of an extreme lack of bills on China, a consequent high exchange rate, making the purchase of silver elsewhere and its shipment to China the cheapest means of obtaining Chinese goods. But by 1837 with the growth of the opium trade, the balance had been reversed, and so great was the drain of silver from China for export to other markets that an Imperial edict of that year strictly prohibited the export of uncoined silver. During the Taiping Rebellion from 1853 to 1859 imports were disrupted to an extent great enough to set the Europeans once more scouring the world for bullion and specie to pay for tea, silk and other Chinese goods.<sup>57</sup>

The trade in private bills in China involved three main categories of paper from the point of view of nationality; bills drawn by English houses, by American firms, and by the Parsees. An English firm in China wanting funds to purchase tea or silk might sell in Canton or Shanghai bills drawn upon itself or its bankers or correspondents payable in England, or might sell bills of other English houses sent out to it from England by its connections there. Conversely, when

<sup>57</sup> R. S. Sayers, "The Standard in the Eighteen-Fifties," *Economic History*, II (Jan., 1933), 584. Professor Sayers has discussed the effects upon the Chinese silver position following upon the Californian gold discoveries of the mid-century. The greatly increased movements of silver to China at that time were imputed by many to an increased preference in the West for Eastern goods; Professor Sayers shows that a monetary phenomenon was responsible. The price levels of the West were raised by the new gold, those of the East were largely unaffected, with a consequent increase in Chinese exports to the West, largely paid for with silver displaced from the circulation of France.

English houses were seeking the means of remittance to England of the proceeds of sales of manufactures in China, both sorts of paper might be bid for in Canton and Shanghai and sent back to England as the best way, in a given commercial situation, of transferring assets to England. American bills were bought and sold in the same way, but were more difficult to assess; Parsee bills were the most dubious in the market. The East India Company's bills on India were of course merely a particular kind of private paper, with specially high standing.

When Rathbone, Worthington and Co. entered the China trade, there were no established exchange banks in China; each trader was obliged, in a way unknown to his modern counterparts, to read the exchange markets for himself. The bankers, like the traders, had been delayed in their penetration of China. The Agency Houses had extended their operations from India after the ending of the East India Company's China monopoly in 1833, and together with a few great China Houses headed by Jardine, Matheson & Co. dominated the scene. In spite of the difficulties of combining banking and mercantile functions, they together successfully resisted attempts to establish English banks for the East right up to the fifties. In this they had as an ally the East India Company with its great obstructive power, used in the attempt to continue its traditional, but now forbidden, remittance business. Not until the later forties did a few small Anglo-Indian banks spring up in India, and open branches in Canton or Hong Kong, offering the first approach to exchange banking facilities.

The mechanisms of the forties were thus highly imperfect. Most transactions were probably in terms of private bills, which in purchase and sale brought prices which reflected both considerations—private credit, and general balance of trade phenomena. But though there were only two Banks in Canton, properly so-called, as late as 1851, all manner of persons were prepared to undertake this or that banking function as occasion seemed to warrant. Information was hard to come by; one new arrival in Shanghai complained—"Nobody seems to do anything in it [exchange], or they keep it very close."<sup>58</sup> Much of the time of principals was spent "outside," ostensibly gossiping, but in reality trying to discover the opinions held by others of probable exchange movements. As with the buying and selling of goods,

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<sup>58</sup> Thomas Moncrieff, Shanghai, to J. Worthington, Canton (R. B. P.), Mar. 1, 1847.

timing was an especially difficult problem. A seller of sterling bills holding for too high a price might fail to "get on with sterling at all" for a particular mail. Or he might find himself in great difficulties as December approached. "The shifts and losses," wrote Brown in 1851, "that sellers last month were put to in disposing of their Bills were incredible."<sup>59</sup> Conversely, of course, good profits could be made by early decisions, "before other parties had made up their minds."<sup>60</sup> Nor did the community of merchants take a very mature view of their exchange markets; they did not regard the establishment of exchange prices as an impersonal thing; as Brown reported, "the re-sale of Bills at a more favourable rate than they were drawn against excites great jealousy in so small an Exchange market as this."<sup>61</sup> It is not surprising that such dealings were described as "nervous work."

But in addition to all these elements of immaturity, the exchange markets especially at Shanghai had a special set of problems. When in a country accustomed to paper instruments, there is a shortage of local currency,<sup>62</sup> it is usual for enterprising persons to attempt to supply the lack with their own notes or bills, for by so doing they are levying a loan on the community concerned while such paper remains current. Those enjoying strategic advantages are of course the most likely to succeed in this. In the Shanghai of the forties and fifties such conditions obtained. At the height of the purchasing season in China there was a shortage of Spanish dollars, and this slender supply flowed mainly through the hands of a particular set of dealers, those selling opium to the Chinese consumer, who by virtue of their strong position could set their own paper afloat in quantity.

Opium was the greatest single means of acquiring dollars—certainly more effective than selling British manufactures, and moreover that showing the greatest profit margin. Thus those with a big share in opium also had a considerable control over the local money market. The Parsees were importers on a large scale, and moreover had intimate connections with the "Opium Shops" or Chinese agencies for dissemination to the consumer. The latter ("many of them a low class

<sup>59</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Dec. 16, 1851.

<sup>60</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Apr. 18, 1850.

<sup>61</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Dec. 16, 1851.

<sup>62</sup> Cooke, *op. cit.*, p. 39. China, unlike India, had long been in this position.

of so-called Banks without much capital or character") issued their own orders, or "opium bills" at 10 or 14 days. These the Parsees acquired in exchange for opium. They in turn were exchanged for sterling bills, the Parsees being able to offer the best rate in the market. Though there was a risk attached, these opium bills were so cheap that they became pretty general. In fact it was very difficult to sell any considerable amount of sterling bills for dollars, without being obliged to pay a much greater price.

To refuse to accept such paper meant that acquiring local funds was an extremely expensive business.<sup>63</sup> Of course if the season was ending with the foreign merchants optimistic about tea and silk prospects in Europe and America, there would be cumulative pressure upon the local dollar, to make purchases, and the number of opium bills would increase. Thus the local dollar shortage was largely filled by the credit instruments of the opium shops, with a great deal of the risk shifted to the English and other foreign merchants who bought and held them.<sup>64</sup>

The Oriental Bank reacted upon this situation in two ways. In general the principal function of a China branch of an Indian banking house was to sell drafts on India to those in China wishing to import Indian goods—chiefly opium. The proceeds in local currency (dollars) were used to buy bills on London, which were then mailed to England, as cover for the drawings made in sterling by the Indian offices.<sup>65</sup> But if occasion warranted, the Oriental Bank would deal directly in opium, selling its sterling bills to the Parsees for drug. This was then re-sold to other parties, for further sterling bills, but at a higher rate. Thus the Bank by means of bills—opium—bills transactions could profit, because of the differential rates at which it sold and bought.<sup>66</sup> The

<sup>63</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Aug. 22, 1845. Sam reported home that in most circumstances the only way to get money in Shanghai without a sacrifice was by opium transactions.

<sup>64</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Nov. 10, 1851.

<sup>65</sup> Baster, *op. cit.*, p. 145.

<sup>66</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Nov. 10, 1851. Brown reported: "We spoke a few days ago to the Agent of the Oriental Bank about the possibility of our soon being able to execute M'Clure's order—he said he could not at present *engage* to give us the funds, although he hoped he might be able to arrange it: and then he asked if we could take opium and pay it to the teamen—the question was of course put to the writer in confidence, and will not of

Bank was not permitted to assume the function of supplying a local currency, but looked to exchange transactions for its profits.

## VI

These conditions in the exchange markets posed a continuing problem to the partners in Rathbone, Worthington and Co. "Profits," wrote W. S. Brown, "will be made as much in the management of the funds and the exchanges as in any other way."<sup>67</sup> But how was an exchange calculation to proceed; what mechanism regulated the prices attaching to all of these elements?

So far as bullion or specie was concerned, there was the fundamental guide of its price elsewhere. The limits to silver shipments can be stated in general terms from the merchants' viewpoint. Imports of silver into China had to stop when the sterling price of silver in other markets<sup>68</sup> became so high that Chinese goods bought with imported silver were too expensive in sterling to yield a profit in Britain or Europe.

This in turn depended upon the conditions of world supply for silver, and the demands made upon it elsewhere. But if there was an excess of imports into China the only effective way for the British merchant to get the proceeds of his sales home would be in silver, because other instruments would be scarce and expensive. China would rapidly lose silver until the cost of a unit of silver in European goods in China rose to such a level that the goods would sell at their mere cost of production and shipment, making their carriage to China unprofitable. But because the reaction of prices in China to the volume to currency was so imperfect, a passive balance could involve very serious losses of silver.

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course be repeated by you; but it is mentioned to give you some idea of the impossibility of selling any large amount here for dollars: the operation of the Bank you will understand is selling its Bills to the Parsees, taking payment in opium, which it was taken to the parties from whom they buy English Bills at a higher rate."

<sup>67</sup> *Ibid.*, Dec. 16, 1851.

<sup>68</sup> Spalding, *op. cit.*, p. 256, gives a table showing the monthly fluctuations in the London bullion market, of the price per oz. of bar-silver, from 1833 to 1916. Between 1842 and 1852 it varied between the extremes of 59 3/8 and 61 5/8 pence. The charges consisted of overland carriage 2 1/2 per cent, insurance 1 1/2 per cent, purchasing commission 1/8 per cent, bank commission 1/4 per cent, and interest for 12 months at 5 per cent (R. B. P. from a calculation dated Apr. 7, 1853).

But paper instruments were perhaps even more difficult for the China merchant to rationalize. They involved in fact two sets of problems: those arising from the national currency they represented, and those arising from the individual credit standing of those who created them, or became subsequent parties to them. The former considerations depended on the trading balance of each country in the markets of Canton and Shanghai; the second upon the record of particular firms. The Indian Banks, whose acceptances began to become general in China toward the end of the forties, were no exception. Rathbone Brothers warned the China House to be careful of the bills of the Oriental Bank, which had been greatly weakened by the failure of many of their customers in Bombay, Ceylon, and Calcutta. Information was also forwarded about the Australian Banks, whose instruments were beginning to become current.<sup>69</sup> The price offered and accepted for each several bill was determined by some sort of calculation which merged these two sets of influences. Thus in primitive exchange markets such as these, there was not at any given time a single price for sterling to which all who wished to buy might have recourse, but only a great number of specific instruments in various national monetary units, each with a price attached.

The units of calculation for the purchase and sale of bills were chiefly sterling, payable in London, the rupee payable in Bombay or Calcutta, the American dollar payable in New York, all quoted in the Spanish dollar. The latter had an intrinsic silver value of 4s. 2d. but up to the end of 1852 exporters could buy six-month bills on London ordinarily at from 4s. 6d. to 4s. 10d. per dollar. The rupee was quoted at something around 225 per £ 100. Domestically there was the notional Tael, defined as a weight and fineness of silver depending on the banking convention of the city concerned.

The supply of bills pertaining to each national group in Canton and Shanghai could vary a good deal with changes in the trading pattern. These in turn, the China merchants well knew, depended in part on the level of activity at home. "As for the turn of the Exchanges against London," wrote W. S. Brown in 1851, ". . . I don't imagine there is any inflation in England just yet."<sup>70</sup> American bills were

<sup>69</sup> J. Worthington, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Sept. 15, 1849.

<sup>70</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Apr. 8, 1851.

particularly volatile, and as Sam Rathbone reported, the need to deal in them "is one great objection to American business."<sup>71</sup> Grave misgivings were entertained about such connections, "unless the parties in America are prepared to lay down funds in imports of some description."<sup>72</sup> The American merchants themselves aggravated the difficulties attaching to their own bills by their methods. Rathbone complained that "nearly all of them here constantly draw in a single month for an amount equal to their whole fortunes in Baring's or Brown's."<sup>73</sup>

The Indian exchanges also required close attention. Occasionally the Parsees would be caught with no means of remittance to India; rupees in China would become scarce and their price rise. Relief usually depended on the arrival of the East India Company's bills from London. These, drawn upon the Presidencies, usually at rates very favourable to remitters of money to the East, were bought up and sent out in anticipation of shortage.<sup>74</sup> But the East India Company's rupees were a dangerous speculation, for a person buying them in London because their price was high in China might well find that the price there was much lower by the time they had been sent to the East. It was also an expensive business involving commission, and interest payments of some 5 per cent, over a lengthy journey. Yet Brown discovered that in spite of these charges, if one operated early in the season, "there is generally a difference (though not always) in favour of receiving funds *via* India."<sup>75</sup> He quoted over the years 1847 to 1851 the rates at which sterling bills on England could be sold for rupees in Bombay, and those at which Spanish dollars in Shanghai could be bought for rupees, to demonstrate this as the cheapest way

<sup>71</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Apr. 18, 1850.

<sup>72</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Nov. 10, 1851.

<sup>73</sup> Until about 1827 American merchants paid in China in silver obtained from the Spanish West Indies, South America, Portugal and Gibraltar. Boston newspapers published advertisements of premiums offered for Spanish dollars. After 1827 American traders paid largely in bills drawn upon London (Latourette, *op. cit.*, p. 71).

<sup>74</sup> Worthington wrote home from Canton (Mar. 24, 1849): "Company's Bills are likely to continue, I think for some time to come a very good remittance to China—as an exchange operation at the present rate the proceeds sent home in sycee would realise 8 to 9% in 4 or 5 months."

<sup>75</sup> *Ibid.*, Oct. 27, 1851.

of laying down the dollar in China. These rates for the rupee reflected the position of India early in the season; a rupee rate in Bombay favourable to sterling and a dollar rate in China favourable to the rupee meant that India's trading was passive toward England and active toward China. Thus Bombay and Calcutta became a favourable means of remittance from England to China. But even within China itself the difference in the trading position of Canton and Shanghai meant that each of the elements in the exchange pattern might bear different prices between these two cities. Up to the early 1850's there was often a better price to be had for sterling in Canton. Bills drawn by one centre upon the other could show such variations as to constitute virtually two markets.

The individual trading house could do little through national currencies to directly effect the prices of exchange to itself. But a House could certainly so act as to gain the highest possible standing for its own private paper, and thus improve the price at which it could be sold. In fact bills fell into well understood categories: those of the first class, headed by Baring's or Brown's, those aspiring to the first class, those which though sound, were of agreed second-class standing, and those so little known or acceptable as to require to be sold on shipping documents.

The struggle for status was conducted under considerable difficulty. "People here," wrote Sam Rathbone not long after arrival, "are shy of taking drafts from any but very large wealthy houses, and Exchange operations are conducted with great difficulty."<sup>76</sup> Important changes in a firm's standing could take place during the lifetime of its bills. Merchants were slow to acquaint themselves with the reputation of Houses not directly and consistently engaged in the China Trade, so that some of very fair reputation had to sell their bills on documents. Status in India too was important, for the market for a bill was significantly narrowed if its creators were not "known in the bazaar of Bombay."<sup>77</sup> This meant that some bills, like those of George Peabody & Co., though of unquestionable standing, could, because of lack of Indian status, be cheaply bought.<sup>78</sup> Then, too, the

<sup>76</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.) May 27, 1845.

<sup>77</sup> *Ibid.*, Jan. 10, 1850.

<sup>78</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), Dec. 19, 1851.

attempt to increase the sale of one's own bills, even though covering balances were held in Britain, might be dangerous.<sup>79</sup> At the height of the season only bills of the Baring class would "go down" at all. Rathbone, Worthington and Co. like others, were aspirants for good status, and succeeded in obtaining it. This meant that they could charge 1 per cent more for their bills. But even high standing could have its disadvantages in the primitive exchange arrangements of the China of the forties and fifties. The reputation of selling one's bills at the highest rate of exchange could mean great difficulty in selling at all when there was an abundance of sterling. Whatever rate such Houses of the first rank fixed, the others being accustomed to sell at 1 per cent below them, always moved down with them, and could frequently do more business. Further, other firms confronted by sellers of such high standing, would authorize their agents to extend their purchases to slightly less notable Houses. "Owing to Russell & Co., Jardine & Co. and ourselves asking such high prices," wrote Sam Rathbone, "Birley and other of Ewart, Lyon and Co.'s friends have now authority to take either Augustine, Heard & Co., Hy Parkinson and Co., or Westmore's Bills."<sup>80</sup>

These then were the problems of marketing bills that confronted the early China merchants: what influences were at work on the value of funds in London, Bombay and Calcutta, and New York, offered for sale in Canton and Shanghai? And what were the terms upon which the several potential buyers and sellers, each attributed a status descriptive of all the elements affecting its standing, were able to do business?

## VII

These new China merchants evidently intended chiefly to deal in goods; in spite of their importance, the exchanges were a secondary consideration. The wisdom of trading with China or any other particular place was governed by a very general opinion about the complementarity of China to other markets. The pressure to open China to trade, culminating in the Treaty of 1842, had little of refined calculation behind it; merely that profits had been made, and that East-

<sup>79</sup> S. G. Rathbone warned that "selling on too general a constituency does not improve a firm's credit."

<sup>80</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Apr. 18, 1850.

West trade could scarcely fail to pay well. And the wisdom of trading at a given moment depended upon the reading of a range of general economic signs, generators (according to interpretation) of optimism or pessimism about particular markets: Bank rate, railway investment, crop reports, prospects of war, and so on.<sup>81</sup> Thus William Rathbone, Jr., surveying the scene during the recession of 1845, tried to reason about the relationship of the forces at work, for the guidance of his brother in the East. He arrived at the most general conclusion that trading might be tentatively revived; he wrote to Sam: "until we think the crisis has reached its height we should not wish *large* operations, but if the rise in money has lowered the produce market, it might do no harm . . . to operate to a moderate extent."<sup>82</sup> Under different conditions the opinion that funds in China could be better employed elsewhere, might be arrived at, and a shift arranged.

But the actions of the trading community, so guided, in turn produced exchange phenomena. The import-export picture of each trading region would be altered, and a consequent change take place in the price of each currency concerned. Misreadings by each several House of the crude general trading signs might be capable of being compensated by skillful exchange bargains, and the trader become incidentally an arbitrageur.

Rathbone and Co. sought to reduce their exchange transactions like those in real goods, to a set of manageable rules. Information was of prime importance, both as to the future trend in national currencies and the credit worthiness of the creators of bills. The attainment of status in all the markets linked to China, from which to conduct operations, was no less necessary. Behind this lay the problem of ensuring that the House was never obliged by its commitments to buy exchange in an adverse market. This could be eased by attempting, in spite of the bunching of transactions within the season, to spread operations and drawings as evenly as possible. Finally, of these rules of practice, there was the most difficult of all: to develop somehow a sense of the way in which all these elements were likely to combine in the minds of fellow dealers in Shanghai and Canton.

But these devices did not of themselves make the exchange problem manageable. For it to become so, the China traders, if the firm

<sup>81</sup> William Rathbone, Jr., to S. G. Rathbone, Canton (R. F. P.), Mar. 17, 1846.

<sup>82</sup> Rathbone Brothers, Liverpool, to S. G. Rathbone, Ceylon (R. F. P.), Nov. 20, 1845.

of Rathbone, Worthington and Co. were at all typical, adopted at least two implicit attitudes to what they were doing. First, each movement of funds in or out of China was treated as a separate transaction, and secondly, dealings in goods and dealings in exchange were also, for the purpose of conduct, to a considerable degree divorced.

Of course the profits or losses of a firm over time really depended upon each movement of goods or funds from England to China and back again forming a continuous chain of transactions which might or might not yield a surplus. To say, for example, how a given project in the purchase of produce in China, its shipment and sale in England would work out, account would have to be taken not only of the cost of the goods, but the cost of the Spanish dollars with which they were bought. But this would mean that transactions from China to England to China, and so on, would form a linked calculation, and no single deal would offer a basis of judgement. The practical solution was simply to regard each remittance as a separate entity, taking the dollars in China for example, from which the transaction began, merely as "given." In fact, as has been said, the decision to move funds either way between England and China was governed by a judgement as to where they would be more profitable in a trading sense. Costs of movement were a secondary consideration except where the exchanges were extremely adverse. Each laying down of funds was treated as a separate self-contained act; its virtue depended normally not upon a comparison between the cost of moving the funds, and the benefits of the course to which they could be put upon arrival, but on the much simpler comparison between the cost incurred by the form of remittance actually chosen, and that pertaining to any other available means of moving the funds. If the job was done at the best rate possible, it was a success in itself.

A similar simplification separated transactions in goods and in money. The philosophically minded might point out that any given act of purchase of Chinese produce would itself affect the exchanges. Similarly, with sales in China; if an English firm could, by reducing its prices, greatly increase its sales, this would of course react upon the exchanges when the question of remittance arose. Thus to take an extreme case, if a relatively slight reduction in the price at which English manufactures were offered brought an enormous increase in sales, English merchants would earn large additional quantities of dollars. These they would seek to sell for sterling for remittance to England, thus possibly raising the cost of sterling to such a high price

that their profits were actually lowered by the increased sale of goods. In general terms, if the Chinese currency, Spanish dollars, could not be sold to advantage either in China or elsewhere, it was foolish to acquire too many by increased sales at reduced prices, and policies to this end were mistaken. To arrive at any complete statement of the effect of any decision affecting buying or selling of real goods, account must be taken of the exchanges, and vice versa. But the harassed China merchant, other than the very largest, left such super-rationalism alone. Exchange rates were in effect a datum; so too were prices. So regarded, it was possible to make "simple-minded" calculations of the cost of laying down funds in goods or in exchange, treating them as independent alternatives, and choosing the more profitable. Frequently there were considerable time lags between transactions earning funds and the attempt to dispose of the funds on the exchanges; as has been said, it was recognized as good policy to spread exchange transactions and the issuance of bills as evenly over the season as possible for safety, independent of the timing of real purchase and sales.

In 1851 came the first step away from this highly personal primitive system of exchange dealings. The Oriental Bank, with a branch of some years' standing in China gained its Royal Charter after a struggle and began to extend its exchange business as the Oriental Banking Corporation.<sup>83</sup> In 1853 the Chartered Bank of India, Australia, and China was incorporated,<sup>84</sup> shortly to be followed by other foreign banks. This development was to culminate in the speculative mania of the fifties in Eastern Bank promotion. But the facilities offered were very welcome to the smaller, newer firms, to whom the older system of dealings had been difficult indeed. The great Eastern Exchange Banks had begun to perfect and impersonalize the Exchanges, to be shortly aided by great reductions in the lags of information and remittance brought about by the electric telegraph.

### VIII

With what degree of success did these young men confront their many problems? Things were difficult indeed at first. The crippling decision against smuggling and opium dealings was firmly held by the House at home and loyally accepted by the China partners in spite of

<sup>83</sup> Cooke, *op. cit.*, p. 141 ff.; it had begun as the Bank of Western India, in 1842.

<sup>84</sup> *Ibid.*, p. 366. The Liverpool Chamber of Commercee mindful of the collapses of 1836-37, 1841-42, and 1846 in China, campaigned for stringent conditions.

their occasional tendency to impatience.<sup>85</sup> The elder William Rathbone, though he interfered little, kept them all firmly to this.<sup>86</sup> Yet they held their own. There were fearful losses in the China trade in 1846, but the firm successfully avoided them.<sup>87</sup> In 1849 Sam observed that in spite of disappointments "on the whole we are the only House in China who have increased our business, and there are only four others who have even kept their relative position."<sup>88</sup> But the end of the decade saw them still pessimistic. Sam felt that taking their first eight years as a whole they had probably neither "lost or made money."<sup>89</sup> Both he and Brown had a period of wishing the House to withdraw; Brown wrote home ruefully that so bad was business that in Shanghai one saw "all the clerks keeping their horses, and nearly all the principals taking exercise on foot."<sup>90</sup> But William at home was more optimistic, and corrected what the China partners freely admitted might be "unsteady judgements." In the upshot the House was reorganized, and for many years thereafter contributed so substantially to the revenues of Rathbone Brothers as to eclipse all other fields in which they engaged.

The principles of trading they evolved saw them through the lean years when so many Houses with less principal had succumbed, so that when expansion of western trade came, they benefited. On taking stock in 1875 the trend was heartening, viz:

*Average Annual Profits in the China Trade.*

(Memorandum, 1875, R. B. P.)

1849-1858—£ 5,352. 1859-1868—£11,590. 1869-1874—£17,424.

S. G. CHECKLAND

*lwp*  
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<sup>85</sup> W. S. Brown, Shanghai, to William Rathbone, Jr., Liverpool (R. B. P.), July 3 1851. Brown wrote: "We seem to have placed ourselves here in altogether a false position, by assuming an establishment, and an expenditure corresponding (saving Jardines & Dent's) with the leading Houses English and American, while by excluding opium and declining to do business like the bulk of the Community (smuggling) we are precluded from those sources of profit which *may* justify them in their large expenditure."

<sup>86</sup> William Rathbone, Jr., to S. G. Rathbone, Canton (R. F. P.), Oct. 22, 1845.

<sup>87</sup> William Rathbone, Jr., Liverpool, to S. G. Rathbone, Canton (R. F. P.), Mar. 7, 1846.

<sup>88</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Dec. 22, 1849.

<sup>89</sup> S. G. Rathbone, Canton, to William Rathbone, Jr., Liverpool (R. B. P.), Jan. 10, 1850.

<sup>90</sup> W. S. Brown, Shanghai, to S. G. Rathbone, Liverpool (R. B. P.), July 16, 1851.

## EDITOR'S COLUMN<sup>1</sup>

Some historians have regarded the Civil War of 1861-1865 as sufficient explanation of the disruption and relative backwardness of the Southern economy. Those who have felt the need for additional analysis have often stopped after pointing to the alleged horrors of Radical Reconstruction or the alleged exploitation of the Southern economy by Northern business interests.

J. Carlyle Sitterson, of the history faculty at the University of North Carolina, takes a more comprehensive view in his article on the southern sugar industry from 1850 to 1910. He shows the significance for this industry of factors which did not originate in the United States at all: the rise of new producing areas abroad, the gradual penetration of the new sciences of agronomy and chemistry into the sugar industry. By working chiefly with plantation records, he is able to trace the interaction of production costs, sugar prices, technological changes, marketing methods, problems of recruiting labor and organizing it into an efficient work force. At the center of these interacting forces was the planter-manager, charged with combining all of these functions in such a way that the productive unit would be profitable.

Students of business history will note another feature of Professor Sitterson's story. During the late nineteenth century, many American firms, in fields as diverse as manufacturing and retailing, sought survival by means of integration. But in those years the existing integration in the sugar industry was destroyed. Vertical integration decreased as planters began to specialize in the cultivation of sugar cane, while central factories for the production of raw and refined sugar were operated by independent firms. And horizontal concentration also was reduced with the appearance of numerous small farmers and tenants as producers of sugar cane.

Dr. Fritz Redlich continues in this issue his account of the Lauchhammer Iron Works, which was begun in the June issue of the BULLETIN. The present installment focuses on the efforts of Count Detlev von Einsiedel and his son to introduce in the Lauchhammer Works the most advanced methods which had been developed in

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<sup>1</sup> Written by Professor Ray Ginger, under whose direction this issue of the BULLETIN was prepared for publication.

other regions. Along with a wealth of detail, Dr. Redlich presents a suggestive theory to account for the prominence of aristocrats among the business innovators of Europe before 1825.

The Far Eastern trade of the nineteenth century, which served as the source of so many New England fortunes, has been the subject of several volumes. But none of these earlier writers has tried to view the trade in detail from the perspective of the merchants who were engaged in it in China. Therefore a blanket of ignorance has covered the daily operations of the China merchants a century ago.

S. G. Checkland, of the Department of Economics, University of Liverpool, shows how to remedy this situation in his analysis of the operations of the British firm of Rathbone, Worthington and Co. These young Englishmen—having little knowledge of markets in China, obstructed by the absence of an organized exchange market, forced to act as commission agents for principals half a world away, beset by a conflict between morals and business in regard to the opium trade—yet won gradually through the shoals to success for their firm. Mr. Checkland here describes the policies and methods which brought profits in the China trade a century ago.

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The Agricultural History Society announces the establishment of the Everett Eugene Edwards Memorial Awards, in honor of the late distinguished scholar in that field. Two prizes will be given each year to the authors of the best articles published in *Agricultural History*: one to a graduate student, the other to a more advanced scholar. The awards, which carry a stipend of \$50 each, are effective in the present year. Further details may be secured from Wayne D. Rasmussen, Acting Secretary-Treasurer of the Agricultural History Society, Room 3906 South Agriculture Building, U. S. Bureau of Agricultural Economics, Washington 25, D. C.

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The annual meeting of the Society of American Archivists was held in Detroit, Michigan, at the Hotel Park-Shelton, September 13-15, 1953. The major sessions of the meeting were devoted to an intensive examination by both European and American authorities of the progress, problems, and techniques in the fields of business archives, business history, and business records management.

HARVARD STUDIES  
IN BUSINESS HISTORY

1. JOHN JACOB ASTOR, BUSINESS MAN  
BY KENNETH WIGGINS PORTER
2. JAY COOKE, PRIVATE BANKER  
BY HENRIETTA M. LARSON
3. THE JACKSONS AND THE LEES: TWO  
GENERATIONS OF MASSACHUSETTS  
MERCHANTS, 1765-1844  
BY KENNETH WIGGINS PORTER
4. THE MASSACHUSETTS-FIRST NATIONAL BANK  
OF BOSTON, 1784-1934  
BY N. G. B. GRAS
5. THE HISTORY OF AN ADVERTISING AGENCY:  
N. W. AYER & SON AT WORK, 1869-1949  
Revised edition. BY RALPH M. HOWER
6. MARKETING LIFE INSURANCE: ITS HISTORY  
IN AMERICA  
BY J. OWEN STALSON
7. HISTORY OF MACY'S OF NEW YORK, 1858-1919:  
CHAPTERS IN THE EVOLUTION OF THE  
DEPARTMENT STORE  
BY RALPH M. HOWER
8. THE WHITESMITHS OF TAUNTON: A HISTORY  
OF REED & BARTON, 1824-1943  
BY GEORGE SWEET GREE
9. DEVELOPMENT OF TWO BANK GROUPS IN THE  
CENTRAL NORTHWEST: A STUDY IN  
BANK POLICY AND ORGANIZATION  
BY CHARLES STERLING POPPLE
10. THE HOUSE OF HANCOCK: BUSINESS  
IN BOSTON, 1724-1775  
BY W. T. BAXTER
11. TIMING A CENTURY:  
HISTORY OF THE WALTHAM WATCH COMPANY  
BY C. W. MOORE
12. GUIDE TO BUSINESS HISTORY:  
MATERIALS FOR THE STUDY OF AMERICAN  
BUSINESS HISTORY AND  
SUGGESTIONS FOR THEIR USE  
BY HENRIETTA M. LARSON
13. PEPPERELL'S PROGRESS: HISTORY OF A  
COTTON TEXTILE COMPANY, 1844-1945  
BY EVELYN H. KNOWLTON
14. THE HOUSE OF BARING IN AMERICAN  
TRADE AND FINANCE: ENGLISH MERCHANT  
BANKERS AT WORK, 1763-1861  
BY RALPH W. HEDY
15. THE WHITIN MACHINE WORKS SINCE 1831: A  
TEXTILE MACHINERY COMPANY IN AN  
INDUSTRIAL VILLAGE  
BY THOMAS R. NAVIN
16. THE SACO-LOWELL SHOPS: TEXTILE MACHINERY  
BUILDING IN NEW ENGLAND, 1813-1949  
BY GEORGE SWEET GREE